

# The Iron Age

A Review of the Hardware and Metal Trades.

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## Schlenker's Automatic Revolving Die Bolt Cutter with Nut Tapping Combination.

This machine will cut threads on bolts and tap nuts from  $\frac{1}{8}$ th to 3 inches in diameter inclusive. It is back geared, and has seven changes of speed. The dies are opened automatically when the desired length of thread has been cut upon the bolt, and can be changed from one size to another in less than one minute. The oil is strained from the chips by a strainer, and the machine is supplied with a Schlenker pump for lubricating, which furnishes a constant supply of oil. The nut tapping apparatus enables the operator to tap nuts from  $\frac{1}{8}$ th to  $1\frac{1}{2}$  inches inclusive, at the same time the thread is being cut upon the bolts, which is a large saving of time on all bolts less than  $1\frac{1}{2}$  inches in diameter. Nuts for bolts larger than  $1\frac{1}{2}$  inches are tapped upon the main spindle. With the machine are furnished 18 sets dies, with steel chucks, increasing by eighths, 18 master taps, 8 nut tap holders, 3 dies and steel chucks for nut tapping, counter shaft complete and steel wrench. The machine illustrated is very heavy and strong, and intended for large work. Smaller sizes are made—or rather smaller machines having the same general features but differing slightly in design and unimportant details. The smallest of these cuts threads and tap nuts from  $\frac{1}{8}$  inch to  $\frac{1}{2}$  inch inclusive. What is called the No. 5 machine has a range of from  $\frac{1}{8}$  to  $1\frac{1}{2}$  inches, and is capable of turning out from 3000 to 3500  $\frac{1}{2}$ th bolts, with  $1\frac{1}{2}$  inches of thread, per day, which is very rapid work. These machines will cut square threads, coach screws and a V thread, and will take in crooked as well as straight work. Those who have used these machines say that they cut a perfect and clean thread, going over the bolt but once, and are adapted to all kinds of bolts, whether crooked or straight. Some of the points of these dies are well worth attention. They are cheap, are opened automatically, can be ground when dull, can be recut many times, and save running back off the thread. The machines can be operated by any boy who can read figures, and the makers state that the threads cut with them will not vary half a thread in length on 10,000 bolts. The gears are all cut, and all the wearing parts are of steel, tempered. The bearings are large. Great stress may be laid upon the fact that the action of the dies in this machine is the same as a lathe tool, taking a clean chip and leaving a strong perfect thread. The Howard Iron Works, Rufus L. Howard, Buffalo, N. Y., manufacture these machines.

## On the Hot Blast, with an Explanation of its Mode of Action in Iron Furnaces of Different Capacities.\*

BY I. LOWTHIAN BELL, M. P., F. R. S.

There has been, probably, no improvement introduced into the manufacture of iron, which created more surprise in the minds of practical smelters and of scientific men, than Neilson's discovery of the hot blast.

In 1829, Messrs. Dunlop & Co., consumed at the Clyde Works, near Glasgow, nearly  $7\frac{1}{2}$  tons of coal to make a ton of pig iron, of which about 20 cwt. were employed under the boilers of the blowing engines, leaving nearly 7 tons for the consumption of the furnace itself. In the year 1833, by heating the air to  $612^{\circ}$  F. ( $322^{\circ}$  C.) they reduced this  $7\frac{1}{2}$  to 3 tons by the mere burning of 8 cwt. of coal in the apparatus for raising the blast to this temperature. The statement first given was strictly true in a commercial sense, but when we come to consider the question as one of physical science, it is necessary to eliminate some of the conditions which conduce to so extraordinary a result.

Anterior to Neilson's time, the fuel employed in smelting iron was coke, and it was supposed at that period, erroneously, however, that coal in its raw state when burnt with cold air, was totally unfit for the purpose in question. This mineral, as it was obtained from the Lanarkshire coal fields, contains about 35 per cent. of volatile matter, but the process of charring it was performed in so unskillful a manner that instead of receiving 88 cwt. of coke from 135 cwt. of coal, 60 cwt. only was the product of the operation. Again, the reduced consumption of carbon in the furnace itself was accompanied by a corresponding diminution of blast, and this was followed by an economy of half a ton in engine coal. After making a proper allowance, however, for all these collateral circumstances, we are within the mark when we admit that in actual coke, which is really the form the fuel has to assume before it is burnt in the blast furnace, not less than 30 cwt. was saved by heating the blast to  $612^{\circ}$  F. ( $322^{\circ}$  C.) This unexpected economy, be it remembered, also, was obtained by the combustion of the 8 cwt. of coal somewhat wastefully applied in the hot air apparatus.

\*A paper read before the American Institute of Mining Engineers, at Philadelphia, June 21, 1876.

Numerous have been the opinions advanced by different authorities in the scientific world to account for this apparent anomaly, but none, in my humble opinion, satisfactorily explains the mode of action of the hot blast. The object of this communication, therefore, is to present to you certain views which I have been led to adopt, after bestowing upon the subject some considerable attention.

Before proceeding to do this I would ask you to review very briefly the nature of the process carried on in an iron furnace, whether it be with hot or cold air.

In opposition to opinions formerly expressed, I ascertained during an extensive series of experiments that oxide of iron was susceptible of reduction to the metallic state at temperatures far below that believed to be necessary. This was proven in a variety of ways. Oxide of iron obtained artificially, and as it exists in various ores, was exposed at known temperatures, in the laboratory, to a current of carbonic oxide, as well as to a mixture of this gas with different proportions of carbonic acid, the latter substance, as is well known, being the product of the reduction in the blast furnace. Secondly, the same substance was afterward placed in cavities in the blast furnace, so as to secure as nearly as possible a heat analogous to that it undergoes in the actual process of smelting.

free to reduce it to the state of carbonic oxide in the manner already stated.

By means of suitable openings in the sides of two furnaces, one 48 and the other 80 feet, I learned that in the lesser, by the time the materials had reached the depth of 12 feet from the top, they had attained a full red heat, whereas in the larger its contents do not acquire this temperature until they have descended to a distance of about 24 feet from the charging plates.

Repeated analysis of gases showed that nearly the full equivalent of carbonic acid due to reduction, and carbonic oxide due to dissociation, were found in the loftier furnace, whereas something like one-fifth of this higher oxide of carbon had disappeared in the other. When it is borne in mind that the heat generated by carbon burned to carbonic acid, and carbonic oxide to carbonic acid, is as 3:33 to 1, the great importance of avoiding using carbon in solid form as a reducing agent will be at once apparent.

[Mr. Bell stated that until a dozen years ago furnaces rarely exceeded 50 feet in height, and in view of the imperceptible character of the advantages of additions to furnaces in favor of the fuel, he did not wonder that the subject had not been pursued further.]

About the period just spoken of an experi-

hot blast. This is too small a margin to bring the consumption of coke per ton of iron to the same figure in each case, but as furnaces receiving air at a high temperature afford a much larger produce of the two, the economy of fuel cannot be said to accompany in a ratable manner the increase of useful capacity, when such increase is the consequence of diminution of the volume of gaseous matter passing through them.

If from any cause the relative proportions of coke, ore and limestone are changed, the power of the mixture to intercept and return to the hearth the ascending heat of the gases, is also modified at the same time. Experimentally, it was shown that the materials used on the banks of the River Tees possessed, bulk for bulk, the following cooling properties on gases passing through them at a temperature a little above that of melting zinc:

Coke taken as unity.....1.00  
Limestone.....1.60  
Calcedon Cleveland iron stone.....2.10

From these figures it was estimated that the ordinary burden of a hot blast furnace possessed a heat absorbing power about one-tenth superior to that of one blown with cold air, and by so much at least is the useful capacity of the former raised by the change. We have rushing upward through the contents of the furnace an immense volume of highly

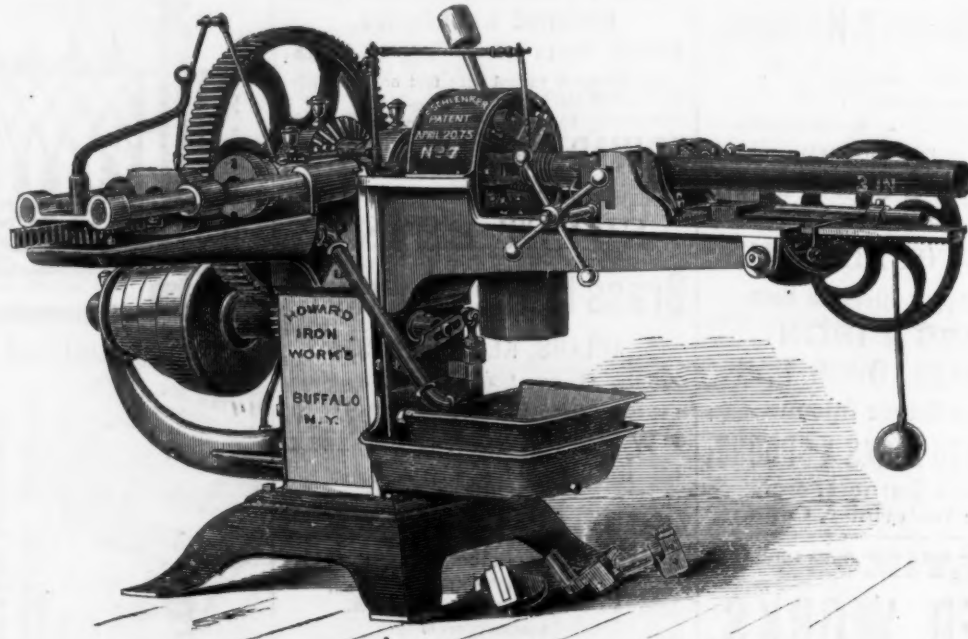
a sufficiently long time to obtain a pretty close approximation to a correct average. The iron ore was then withdrawn and an equal weight of a mixture of blast furnace slag and splints was charged in its stead. During the use of these substances, inert so far as any chemical action between them and carbonic oxide is concerned, the average temperature of the gases fell about  $100^{\circ}$  C. ( $212^{\circ}$  F.).

It will be shown hereafter that the circumstance of the upper region being a heat evolving one, is of importance, because to it, in my opinion, is due the fact that after certain dimensions of furnaces are reached, no further cooling of the escaping gases ensues, from their having to pass through an increased quantity of the solid material used in the process. Seeing that the mere cooling of the gases are due either to the size of the furnace or to a diminution of their volume, as happens where heated air is employed, does not suffice to account for all the economy effected by pursuing either of these modes of working. We are led to consider whether the chemical conditions attending the process are not modified by the change, and modified in the same way in both cases, when we raise the temperature of the blast or increase the capacity of the furnace. The only phenomena of a purely chemical nature necessary to be considered for our present purpose is the reduction of the iron to its metallic state and the behavior of the carbonic acid which accompanies this process. The deoxidation of an ore of iron, of course, a work of time, for the reducing gas has to penetrate into masses of greater or less magnitude. If before it has done this in a perfect manner the mineral reaches a zone of the furnace where the temperature enables the carbon of the fuel to attack the carbonic acid generated by the act of reduction, we have to submit to the loss already referred to. Should this reversed action take place to the extent of one-half the carbonic acid due to the operation, a loss of about 30 per cent. of the heat required for the smelting of a ton of pig iron ensues. The advantage, therefore, resulting from the use of a sufficiently lofty furnace is the adjustment of the temperature of its different zones, so that the ore is reduced under circumstances where, so far as possible, this underburning, as it were, of carbonic acid is avoided. The same end is obtained by diminishing the volume of the gases attending the generation of a given amount of heat. This happens when the full blast itself is raised in temperature, while the saving of furnace fuel is necessarily increased by the heat of which the air is thus made the vehicle.

Before proceeding with proofs in support of the general correctness of the views just set forth, I would shortly direct attention to what has been assigned by older writers as the cause of saving of fuel, which could not, of course, be accounted for by the actual heat contained in the hot blast itself. Practically, they all amounted to the same thing—an increased temperature in the zones of combustion, and fusion resulting from a more rapid burning of the fuel or by avoiding the refrigerating effect of throwing a large body of cold air into the hottest part of the furnace. I may observe, in reference to this supposed change in the velocity with which the atmospheric oxygen combines with the carbon at the tuyeres, that, so far as I know, no analyses of the products of combustion have been adduced in justification of such an hypothesis.

The experience afforded by the Siemens regenerative furnace might appear to warrant the conclusion of an increased intensity of temperature by the preliminary heating of the blast. There is, however, no real analogy between heating the air for smelting iron and that required by Siemens, because in every cold blast furnace the so-called "regenerative" principle is already in constant operation. The materials above the tuyeres in it, as they descend in a continuous stream, perform precisely the same office as that obtained from the back cells of the regenerator. I have sought upon different occasions to learn to what extent the incoming solid contents of a blast furnace acted in the manner just described. Immediately on blowing in, the temperature of the escaping gases was taken, and observations on this point were continued until their mean heat became stationary. By estimating the total quantity produced by the coke during the period in question, and deducting from it the heat known to be absorbed by the performed duty, the difference was regarded as that retained by the materials. From the data thus procured it was estimated that during any given time, of the heat actually available in the hearth, 70 per cent. was due to that previously generated and returned to the region of fusion by the current of solids during its descent. Attending the supposed more rapid combustion at the tuyeres was an elevation of temperature which, in some unexplained way, had to operate beneficially in effecting the fusion of the pig iron. It appears to have been overlooked that the addition of more material to be acted on by a given weight

[Continued on page 15.]



IMPROVED BOLT CUTTING AND NUT TAPPING MACHINE.

Thirdly, the gases of different furnaces, taken at different heights above the tuyeres, were analyzed, by which means it was ascertained when the combined oxygen appeared in quantity to that corresponding with the nitrogen as found in atmospheric air—proving that the materials under treatment had at certain points ceased to give off any notable quantity of oxygen.

In a very few minutes after the materials are shot into the throat of the furnace, reduction begins, and in most cases by the time it has traveled down 12 or 15 feet this division of the process is completed. Below this level, omitting any chemical action connected with the formation of cyanogen salts, the value of height in the blast furnace must only be regarded as a means of intercepting the heat carried up by the rapid current of gases generated by the combustion of the fuel at the tuyeres. These gases, immensely expanded by the high temperature prevailing in the hearth, arrive speedily at the point of exit, and, in event of the furnace being of insufficient height, they carry with them, in the form of sensible heat, the useful effect of a considerable portion of the combustible employed in the operation.

This, however, is not the sum of the loss due to inadequate dimension. Each equivalent of peroxide of iron, the usual component of metal, as it exists in our ores, requires for its reduction three equivalents of carbon, which may be present either in solid form or as the gas carbonic oxide. In the former case carbonic oxide, and in the latter carbonic acid, is the product of the reaction. In most cases it is the lower oxide of carbon which is the immediate agent of reduction; but in the event of this generation taking place when the contents of the furnace are at a high temperature, carbonic acid is brought back to the state of carbonic oxide by meeting with highly incandescent carbon. In this way, to all intents, the heat evolved does not exceed that obtained by burning carbon direct to this last named gas.

In addition to the source of carbon just named, there is a second arising from the dissociation of carbonic oxide, two equivalents of which are split up by oxide of iron into one of carbon and one of carbonic acid. It is equally important that this action should also be effected when the temperature does not suf-

ment of a much bolder nature was undertaken by Messrs. Bolckow, Vaughan & Co., Middleborough, who raised a furnace from 45 to 75 feet, with the original boshes of 15 to 16 feet. Still further enlargements were made at a later period.

Had the use of furnaces 70 or 80 feet high preceded Neilson's invention, I do not think it would have occurred to us to have attributed the saving of coke to any mysterious peculiarity in the nature of the combustion which takes place at the tuyeres. Instead of propounding the puzzling doctrine, as has been done to account for the heat proceeding from a few hundred weights of coal burnt in the hot air apparatus, saving a much larger weight in furnace, we would probably have sought to identify the mode of action of the hot blast furnace with that of a mere addition of capacity.

I propose to show, in the first instance, how the substitution of heated for cold air is equivalent to an increase in the capacity of the furnace, and then to follow this up by pointing out other circumstances which, in my judgment, perform a supplementary part in raising the efficiency of a furnace using hot blast.

In all cases the fuel used is considered as coke, iron as No. 3, and the air was heated by waste gases. These were collected by hermetically closing the furnace by the cup and cone.

By repeated analyses of the gases from a 48 foot hot blast furnace, and by careful examination of the temperature of the air, I was led to the conclusion that out of every 100 heat units evolved in its interior there was due to

Combustion of carbon..... 88  
Contributed by the blast..... 12  
Total..... 100

So far, then, as an abstract question of volume of gas is concerned, 14 per cent. in the instance just quoted is produced without any more vaporous matter escaping from the tunnel head than if 86 units of heat had resulted from the combustion of carbon, fed with air at  $0^{\circ}$  C. ( $32^{\circ}$  F.). If, however, we propose to ourselves the problem as to the increase of capacity required to permit the flow of gases through the contents of a furnace to correspond with the diminution of volume due to the heat contributed by the blast, 7000 cubic feet in one blown with cold air ought to be equal to the duty performed in 6000 cubic feet, worked with

heated gas, meeting a descending column of solid cooler material. In cases where these two currents are moving more slowly than in others, it might be imagined *a priori* that the gases would part with more of their heat, and that, as a natural consequence, the consumption of fuel would be lessened. The very reverse, however, is the fact, unless the rate of driving is in excess of the power of the structure.

Circumstances arose at the Clarence Works which rendered it necessary for some weeks to slacken the quantity of blast received by six furnaces having a height of 48 and a capacity of 6000 cubic feet. The following shows the effect of the alteration:

Average Make per Week.	Average No. of Iron.	Cwts. of Coke.
Normal Speed of Work.		
246.....	373	27.50
219.....	345	28.98
206.....	320	31.06
186.....	360	30.31

Within certain limits, therefore, the gases rise in temperature under such conditions as those just described.

The heat carried out by the furnace represents so much loss, and more or less the effect of the change manifests itself in the figures by an increase in the quantity of combustible required for the same duty. The phenomenon just described I conceive to be due to the generation of heat which takes place in the reducing zone of the furnace, which is one of 48 feet in height, is confined to a third or a fourth of its upper part. Of the 86 units, already referred to as evolved by the combustion of the fuel, fully one-third is due to the conversion of carbonic oxide to carbonic acid, which conversion is exclusively effected by the oxide of iron of the ore. It is true the escaping gases do not by their temperature indicate that so large a proportion of the heat developed by the combustion of the fuel is produced so near their point of exit. The absence of a corresponding amount of sensible heat in the gases is due to its absorption by the oxygen in its change from the solid to the gaseous form. The balance between these opposing tendencies is not considerable, and it being a doubtful, and at the same time an important matter in a practical point of view, I made its investigation the subject of direct experiment on a large scale. The temperature of the gases escaping from a furnace was observed during

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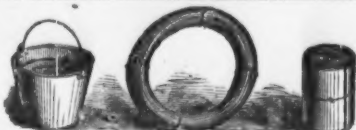
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Ship and Railroad Lanterns,

Signal Lights, Conductors' Lanterns,

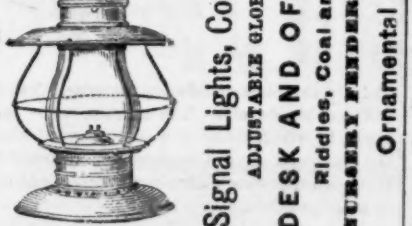
ADJUSTABLE GLOBE HAND LANTERN,

DESK AND OFFICE RAILING

Riddles, Coal and Sand Screens,

NURSERY FENCIBLES & SPARK GUARDS

Ornamental Wire Fence.



**Geo. W. Prentiss & Co.,**

HOLYOKE, MASS.,

MANUFACTURERS OF

**IRON WIRE.**



Bright, Coppered, Annealed and Tin

Plated. Also GUN SCREW WIRE

Of all sizes straightened and cut to order.

**IRON AND STEEL WIRE ROPE**

For Hoisting, Running & Standing Ropes, Ferries, &c.

CONSTANTLY KEPT ON HAND.

Address, HAZARD MFG. CO., Wilkesbarre, Luzerne Co., Pa.

**ALBERT A. ARNOLD.**

(Formerly SAMUEL PARKER & CO.)

Manufacturer of

**BRASS, COPPER, STEEL & IRON**

**Wire Cloths**

FOUNDRY RIDDLES, STEEL BROOMS & CASTING BRUSHES, Wire Flower

Stands, Sponge Baskets, &c. Painted Wire Window Screen Cloth a Specialty.

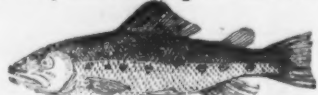
Office and Manufactory, 161 Whalley Ave., New Haven, Conn.

New York Agency, PATTERSON BROS., Park Row, N. Y.

**New Jersey Wire Mill.**

HENRY ROBERT

## Philadelphia Fishing Tackle House



**A. B. SHIPLEY & SON,**  
503 Commerce Street, PHILADELPHIA.  
Manufacturers of  
**FISHING TACKLE, CHALK & FISHING  
LINES, FISH RODS, FLY-LEADS,  
ERS, RODS, REELS, &c.**  
A specialty of celebrated Green Heart Wood and Fine  
Brass and German Silver Rod Mountings. Our prize  
medal Bent and Grad and Green Heart Trout and Bass  
Fly Rods are the best in the world.  
Sole Agents for John James & Sons' Fish Hooks,  
Needles, &c.  
Price Lists to the Trade only on application.

**BRADFORD & ANTHONY,**

374 Washington St., Boston.



**FISHING TACKLE**  
IMPORTERS, MANUFACTURERS & DEALERS IN  
**Fishing Tackle,  
Fishing Rods,  
Fish Hooks,  
AND  
ANGLING IMPLEMENTS.**

**TIN LINED IRON PIPE.**

A pure **BLACK TIN PIPE** within a wrought  
iron tube, combining Purity, Strength, Durability  
and Cheapness.

**TATHAM & BROTHERS,**  
82 Beekman Street, N. Y.

**Verona Tool Works.**

**METCALF, PAUL & CO.,**  
Pittsburgh, Pa.

**Sledges, Hammers,  
AND SMITHS' TOOLS,  
AND THE STANDARD**

**Verona Solid Eye Picks.**  
All warranted the Best Solid Cast Steel.

**EDWARD SWEENEY, Brass Founder,**

**GONG BELLS.**  
Steamboat and Locomotive Gongs kept on hand. A  
liberal discount to the trade. Bell hanging and jobbing  
done to order.  
4 DUANE STREET, N. Y.

**REDUCTION.  
Manila Pails**

REDUCED TO \$7.50 PER DOZ.

These goods we warrant not  
to be affected by climate, or  
water, hot or cold.  
Are Durable, Light, Strong  
and Tasteless, have no  
hoops, and will not absorb  
their contents. Orders from  
the trade solicited.  
For circulars and terms, ad-  
dress,  
**W. F. HYATT,**  
Manufacturers' Agent,  
280 PEARL ST., - NEW YORK.

**THE  
Gilbert & Bennett Mfg. Co.,**  
GEORGETOWN, CONN.,  
MANUFACTURERS OF

**Iron Wire, Curled Hair  
AND GLUE.**

**Gilbert's Rival Ash Sieve.**  
**NION METALLIC CLOTHES LINE  
WIRE.**

highest price paid for Cattle's Tails and Hog's Hair  
**WAREHOUSE,**  
273 Pearl Street, New York.

**BEST IN THE WORLD.**  
**Blatchley's Horizontal  
ICE CREAM FREEZER**  
(Tingley's Patent)

For Saloons, Hotels, Families  
and Ice Cream Manufacturers,  
in the economy and  
perfection of its work, is en-  
tirely unequalled. The  
closed head will save ice  
enough in one season to pay  
for the machine. The tub  
requires but one filling to  
freeze. Size, 3 to 40 quarts.

Persons are cordially invited, when in town to the Big  
Exhibition, to come and see us, or send for descrip-  
tional and price list. Very liberal arrangements  
made with the trade. The machines can also be seen at  
the Centennial Exhibition, Agricultural Hall, Cor-  
ner 9 and N. Columns letter O, No. 18.  
**BLATCHLEY, Manuf.,** 504 Commerce St., Phila.

**BUCK BROTHERS, Millbury, Mass.**

The most complete assortment in the U. S. of **Shank, Socket Firmer, and Socket Framing  
Chisels,**

**PLANE IRONS.**  
Gonges of all lengths, and circles beveled inside or outside. Nail Sets, Scratch and Belt Axes, Chisel  
Handles of all kinds. Orders filled promptly; generally same day as received.

**BUCK BROTHERS, Millbury, Mass.**

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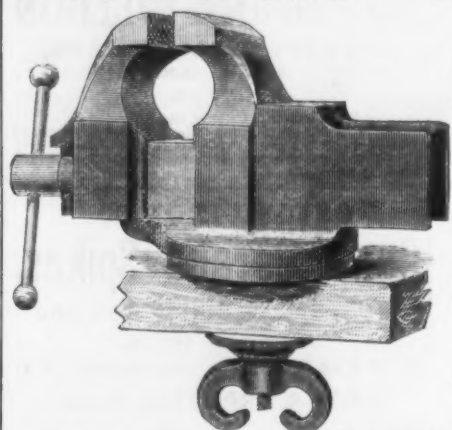
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**BUCK BROTHERS, Millbury, Mass.**

**New Model Swivel Vise.**

The advantage claimed for this Vise over the  
ordinary patterns is in the ease with which it is  
adjusted to whatever angle may be required.

**Trenton Vise & Tool  
Works,**  
TRENTON, N. J.,  
Manufacturers of  
Solid Box Vises, Hammers, Sledges,  
Picks, Mattocks, Grub Hoes, &c.

**Warehouse,**  
101 & 103 Duane St., NEW YORK.

**HERMANN BOKER & CO.**

Our Vises are warranted to do more work than any other make. No broken boxes or screws.

**HERMANN BOKER & CO.**

**The Faultless Fruit Can.**

PATENTED.



The perfection of this article, in all of the essential points of a good  
fruit preserver, has been thoroughly demonstrated by the immense num-  
ber sold. The demand increases, but with largely increased facilities we  
shall be able to meet the wants of the trade. As the can tapers slightly  
when made up, they nest together, thus saving space greatly. The  
opening is the full size of the top of the can, admitting of perfect clean-  
ing and drying; and so making them much more durable.  
When not in use for Fruit they make a very nice receptacle for Tea,  
Coffee, Spices, etc., the close fitting cover making it air-tight.  
Another important feature is the labeling device, whereby the con-  
tents of the can, date, and method of preserving are easily shown.  
We furnish the complete trimmings for the **FAULTLESS CAN**,  
including the body all ready for soldering, at the following very low prices,  
viz:—  
\$3.50, 1 qt.; \$10.50, 1 1/2 qts.; \$12.50, 2 qts. per gross.  
Cans made up ready for use:—  
\$9.75, 1 qt.; \$11.75, 1 1/2 qts.; \$13.75, 2 qts. per gross.  
We would caution dealers against an imitation of our can having a  
"swell" or "dead" near the top to prevent the cans sticking together when  
nested, as this feature is covered by our Patents.  
The Trade only supplied.  
Use good Sealing Wax for this, and all other cans, to secure good  
results.

**F. STURGES & CO., Sole Manufacturers,**  
72, 74 & 76 Lake Street, CHICAGO.

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**F. STURGES & CO., Sole Manufacturers,**

**An Improved Chimney Top.**

We show in the accompanying illustration  
the patent "Volcano" chimney top, made by  
Jones & Stebbins, 580 State street, Chicago,  
Ill. The opening in the back of the revolving  
hood, which is always presented to the wind,  
is extended by a tapering tunnel to near the  
mouth of the hood, and any air passing into  
and through this funnel must make a partial  
vacuum in the chimney. The principle is the  
same as that employed by the Giffard In-



jector and many similar devices, in which a  
steam exhaust is employed in creating a partial  
vacuum. In the case of the "Volcano" chim-  
ney top the wind operates in the same way as  
steam in the Giffard injector. We have good  
accounts of its practical working, and can see  
no reason why it should not coax a draught  
through the most obstinate chimney. It is cor-  
rect in principle, and in an exposed situation,  
should make a strong up current in any flue to  
which it is applied.

**"Centennial Chimes."**

Of the many interesting features at the Cen-  
tennial Exhibition, few attract more attention,  
or give more real pleasure to the great multi-  
tudes that will there assemble, than the music  
from the chime of bells exhibited by the  
McShane Bell Foundry, of Baltimore. It is  
the only chime in the Exhibition, and is com-  
posed of 13 bells, representing the 13 original  
States of the Union. These bells are all large,  
the smallest weighing about 300 lbs., and the  
largest upward of 4000 lbs., the 13 aggregating  
over 21,000 lbs. They comprise a full octave  
and one-third, with a flat seventh and a sharp  
fourth, and possess clearness, richness of tone  
and great volume of sound, and are constructed  
in the most admirable and substantial manner.  
The bells are hung in the main tower, on the  
northeast angle of Machinery Hall, near the  
main entrance (Belmont Avenue) to the exhibi-  
tion grounds. These are the first chime of  
bells ever cast in the State of Maryland, and are  
in charge of Professor Widdows, the famous  
chime ruler of Metropolitan Church, in Wash-  
ington, D. C., who is a thorough musician, and  
who has achieved the reputation of being one  
of the finest "chimers" in the world.

The bells are hung in a heavy oaken frame,  
with the largest of the 13 bells in the center,  
and are "played upon" by two rows of levers  
and one row of pedals, by means of steel wires  
and cast iron elbows attached to the bell ham-  
mers, rendering manipulation remarkably easy.  
The chime was cast expressly for exhibition at  
the Centennial at a cost of over \$10,000, and  
will prove one of the most pleasing of the many  
attractions there, and is no doubt the most  
costly "exhibit" made by any single firm in  
the world, and, without exception, are the  
finest chime of bells ever cast in this country.  
On the opening day, May 10th, they were rung  
at sunrise. On that day, at 9 o'clock a. m.,  
when the representation of the nations of the  
earth had gathered together, and the officials  
high in position of our own country had met  
to formally open the Exhibition, which, after  
several years of arduous labor and anxiety has  
thus far been crowned with success, the chimes  
from the McShane Bell Foundry, of Baltimore,  
were the first to proclaim the glad tidings, ring-  
ing out in clear, resonant tones, the news to  
the world.

The bells from this well known establish-  
ment excel in volume of sound and richness of  
tone and superior workmanship. A peculiarity  
of the bells of the McShane Bell Foundry is the  
attention given to musical laws in the tone  
of them; even the largest size, some 15,000 lbs.,  
sounding exactly the note which it was cast for.  
All bells cast at this foundry are made of genu-  
ine bell metal, composed of Lake Superior cop-  
per (carrying silver) and government bismuth,  
and are so modeled as to secure that proportion  
between the diameter, height and thickness, as  
shall produce the desired acoustic effect in the  
highest degree. In this particular these bells  
are most excellent, all their patterns being  
made from mathematical formula, which they  
have deduced from the results of a long course  
of study and 40 years' experience.

The establishment of Messrs. McShane & Co.  
is one of the largest and best equipped in the  
country, and possesses every facility for the  
production of bells of every description, such as  
church bells, fire alarm, chimes, court house,  
academy and factory bells, ship, steamboat,  
plantation and farm bells, all of which are made  
in the best manner, and strictly first-class in  
each and every particular. A specialty being  
made of chimes and peals of bells of any num-  
ber, in perfect tune and accord with each other,  
and arranged to be played by one person upon  
levers, so that any one able to read music can  
play tunes upon them. The members of the  
firm are Henry and John McShane, who are  
thorough, practical business men, understand-  
ing the art of bell making in every detail, and  
the costly chime of musical bells which they  
have placed in the great tower of Machinery  
Hall, is an evidence of the interest they have  
taken in the Centennial. The chimes ring out  
morning, noon and evening over the hum of the  
busy crowds.—Philadelphia Commercial.

**Engineering History of the Country.**

The following is a synopsis of a very inter-  
esting paper read at the annual meeting of the  
American Society of Civil Engineers, held in  
Philadelphia, last week, by Mr. Theodore G.  
Ellis, of Hartford, vice-president: Washington  
was the first civil engineer of which the  
speaker had found any record. He gave  
some attention to canals, and was after-  
ward on a commission for improving the  
navigation of the Potomac. The year 1787  
was a date of great interest to the profession.  
In that year, John Fitch, a Philadelphian,  
built the first steamboat, and there is every  
reason to believe that when he built it he was  
ignorant of Watt's improvements. He built  
the first propeller ever constructed in 1790; in  
1798 he built the first steamboat for carrying  
passengers, and in 1799 ran it on the Delaware,  
between Philadelphia and Burlington. In 1804  
Oliver Evans, of Philadelphia, constructed the  
first machine for building docks—a heavy, flat  
bottom boat, with a chain and buckets to clear  
out the mud. It had wheels for land and a  
stern wheel to propel it in the water. It seems  
to have been the archetype of stern wheel  
boats. At this time stage coaches had not come  
into use. In 1807 Robert Fulton built his steam-  
boat, and in 1811 he and Mr. Stephenson built  
a stern wheel boat at Pittsburgh, with which  
a voyage was made to New Orleans in 14  
days. This was the first steamboat on Western  
waters.

The introduction of stage coaches produced  
a demand for bridges across the larger streams,  
and here was a fine field for engineering talent.  
Among these early structures was the magni-  
ficent 340 feet span over the Schuylkill, built in  
1812 and burned in 1838. Travel between New  
York and Philadelphia a century ago can be  
estimated from the advertisements in the daily  
prints of that day, naming the time at which  
a stage coach would leave for New York twice  
a week. On the celebration of the semi-Cen-  
tennial anniversary it was recorded as a matter  
of great wonderment that as many as 300 New  
Yorkers were in Philadelphia. In 1823 the  
Champlain Canal was finished and several  
others were in progress. About this time the  
evidences of progress in civil engineering began  
to multiply, railroads were first talked of, and  
there were few to prophesy what should result  
from their introduction. In fact, it was author-  
itatively stated that the claim that locomotives  
would some day travel 12 miles an hour was  
bringing ridicule and harm to the whole pro-  
ject.

The first locomotive run in this country was  
built in England and was called the Lion. The  
first built in this country was constructed on  
West street, New York, in 1829. It was a four  
wheeler with upright boiler, and was built for  
the South Carolina road. Baldwin commenced  
to build engines in 1833. The first iron railroad  
bridge consisted of three spans 55 feet long  
for the Baltimore and Susquehanna Railroad  
Company in 1846, built by James Mulholland.  
Iron suspension bridges were previously used  
in 1796, over Jacob's Creek, Virginia, built by  
Mr. Finley. Iron bridges, however, did not  
come into general use until just before the civil  
war.

In fact, in the short space of a century,  
American engineering has sprung from obscur-  
ity to be equal to any in the world. We have  
the longest bridges, with the greatest span and  
deepest foundations, and the only railway sus-  
pension bridge in the world; the longest rail-  
ways, the best equipped, and supplied with the  
most comfortable conveniences. It is idle to  
prophesy where another century's progress  
may find it. The day will come when men  
will smile at iron bridges when a lighter, strong-  
er and more abundant metal will supplant iron.  
In aluminum is found lightness combined with  
strength, the only drawback to its use being  
the expense of extracting it from its combina-  
tions. It is not too much to expect to see  
bridges of a mile span made out of this metal.  
It is peculiarly appropriate that the conven-  
tion should meet in Philadelphia on this Centen-  
nial year, for it is well known to most of the  
members that the science of engineering in this  
country commenced in Philadelphia, and many  
of the great inventions which gave an impetus  
to it can be traced directly to that city.

**The Officers of Machinery Hall, Cen-  
tennial Exhibition.**—The following list will  
be found convenient for reference by exhibi-  
tors in Machinery Hall:

John S. Albert—Chief of Bureau of Machinery  
Hall.  
Malum Stetson—Secretary.  
J. G. Sanderson—Volunteer aid.  
Friedrich Ungever—Volunteer aid.  
Lewis W. Robinson—Superintendent in  
charge of office.  
Henry Fourfax—Engineer.  
Joseph Hirst—Superintendent in charge of  
Machinery Building.  
G. H. Woods—Engineer in charge of south-  
east section of Machinery Building.  
Wilson K. Purse—Engineer in charge of  
northwest section Machinery Building.  
George H. Hubbard—Engineer in charge of  
south-west section Machinery Building.  
Philip Voorhee—Engineer in charge of north-  
east section of Machinery Building.  
John Cotter—Engineer in charge of hydraulic  
annex.  
James L. Hodson—Engineer in charge of  
shafting.  
John T. Hawkins—Superintendent in charge  
of all buildings south of but connected with  
Machinery Hall.  
Philip Pistor—Engineer of the same.  
William A. Dripps—Superintendent of all  
buildings west of but connected with Machinery  
Hall.  
John D. Curtis—Engineer of the same.  
L. D. Norton—Superintendent in charge of  
all boilers and steam pipes.  
J. C. Kilgore—Engineer of the same.  
W. E. Plummer—Superintendent of Shoe and  
Leather Building.

**Iron.**  
NEW YORK.

**OGDEN & WALLACE,**  
Successors to GAM'L G. SMITH & CO.,  
**IRON WAREHOUSE,**  
85, 87, 89 and 91 Elm Street, New York,  
(One block below Canal Street.)  
**COMMON AND REFINED IRON**  
**SHEET AND PLATE IRON,**  
Rod, Hoop, Band, Scroll, Horse Shoe,  
**Angle and T Iron.**  
**PIG IRON, OLD RAILS.**  
Wrought Iron Beams. Iron of all sizes and shapes  
made to order.

**PIERSON & CO.,**  
**Iron Warehouse,**  
24 Broadway, 77 & 79 New St.,  
NEW YORK CITY.

**IRON and STEEL,**  
Common and Refined Iron Rods,  
Hoops, Bands, Scrolls, Horse Shoe,  
Ovals, &c., &c.  
Swedes, Norway, Lowmoor & Bagnalls.  
Orders filled from stock at lowest prices.

**JACKSON & CHACE,**  
306 & 208 Franklin St., N. Y.,  
Importers and Dealers in

**IRON and STEEL.**  
Agents for  
JOHN A. GRISWOLD & CO'S  
Bessemer Steel.  
MACHINERY STEEL,  
Cast Steel and  
SPRING STEEL,  
ANGLE and T IRON.  
Special Irons for Bridge and  
Architectural Work.

**ABEEL BROTHERS,**  
Established 1765 by ABEEL & BYVANCK,  
**Iron Merchants,**  
190 South Street and 365 Water, N. Y.

**ULSTER IRON**  
A full assortment of all sizes constantly on hand.  
Refined Iron,  
Horse-Shoe Iron,  
Common Iron.  
Band, Hoop and Scroll Iron.  
Sheet Iron.  
Norway Nail Rods,  
Norway Shapes.  
Cast, Spring and Tire Steel, etc.

A. R. WHITNEY. J. HENRY WHITNEY.

**A. R. Whitney & Bro.,**  
Manufacturers of and Dealers in

**IRON,**  
56, 58 & 60 Hudson,  
48, 50 & 52 Thomas, and } NEW YORK.  
12, 14 & 16 Worth Sts., }  
Our specialty is in

**Manufacturing Iron**  
Used in the Construction of

**Fire-Proof Buildings, Bridges, &c.**  
AGENCY OF

Abbott Iron Co. Boiler Plate & Tank Iron.  
Ginsbury Tube Works Boiler Plate.  
Pensacola Iron Works Shaping.  
Passaic Rolling Mill Angles and Tees.  
A. R. Whitney & Bro.'s Rivets.  
Whitney's Best Bar Iron.  
Passaic Rolling Mill Wrought Iron Beams  
and Channel Iron.  
Faxon Rolling Mills.  
Hooks containing Cuts of all iron now made, and Sample  
Pieces at office. Please address 58 Hudson Street.

**METAL ROOFING.**  
**Hickcox Mfg. Co.,**  
280 Pearl Street, N. Y.,  
Manufacture the Patent C. ranted Iron Shingles,  
making the most durable roof in the market, not  
affected by contraction or expansion, which causes  
soldered tin roofs to leak. Price only \$6.50 per square,  
painted on both sides, packed ready for shipping.

**BORDEN & LOVELL,**  
**Commission Merchants**  
70 & 71 West St.,  
New York.  
Wm. Borden, }  
L. N. Lovell, }

Agents for the sale of

Fall River Iron Co.'s Nails,  
Bands Hoops & Rods,  
AND  
Borden Mining Company's  
Cumberland Coals.

**WILLIAM H. WALLACE & CO.,**  
**IRON MERCHANTS**  
Cor. Albany & Washington Sts.,  
NEW YORK CITY.

Wm. H. Wallace. Wm. Bispham

**W. R. OSTRANDER,**  
Manufacturer of THE BEST IMPROVED  
**ALARM SPEAKING TUBE WHISTLE,**  
speaking Tube, Elbows and Mouthpieces,  
send for new Trade List.  
SPEAKING TUBES FITTED UP.  
19 Ann Street. NEW YORK.

**Iron.**  
NEW YORK.

**G. HUERSTEL,**  
**IRON and STEEL.**  
Warehouse, 99 Market Slip, N. Y.  
Branch Store at 213 E. 23d St., 5 doors east of 8d Ave.  
**IRON and STEEL OF ALL KINDS**  
Constantly on hand. Horse Shoe Iron and Nails, Nor-  
way Iron, Cast Spring, Toe Calk, and  
Bessemer Steel Tire.  
Also, SPRINGS, AXLES and BOLTS,  
For Truck and Carriage Makers.

**A. B. Warner & Son,**  
**IRON MERCHANTS,**  
28 & 29 West and 52 Washington Sts.  
**BOILER PLATE,**  
Boiler Tubes, Angle, Tee & Girder Iron,  
Holler and Tank Rivets.  
Sole Agents for the celebrated  
"Eureka," Pennocks,  
"Wawasset," Lukens,  
Brands of Iron. Also all descriptions of Plate, Sheet,  
and Gasometer Iron. Special attention to Locomotive  
Iron. Fire Box Iron a specialty.

**Geo. A. Boynton**  
**BROKER IN IRON**  
70 WALL ST., N. Y.

**POWERTVILLE**  
**ROLLING MILL,**  
JOHN LEONARD,  
450 & 451 West Street, NEW YORK.  
Manufacturer of Best Quality  
**HORSE SHOE IRON,**  
And HOOPS. Also Best Quality  
Cold Blast Charcoal Scrap Blooms,  
And Dealer in OLD IRON.

**Marshall Lefferts, Jr.,**  
90 Beekman St., New York,  
MANUFACTURER OF  
**AMERICAN**  
**Galvanized Sheet Iron,**  
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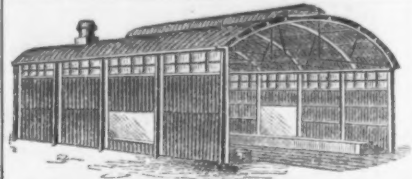
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Wrought Iron Buildings, Wrought Iron Bridges, Cor-  
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**NAILS AND BAR IRON.**  
Rings, Scrolls, Horse Shoe Bars, Nut and  
Rivet Iron, Spike Rods, Shunting Bridge  
Bolts, Ovals, Half Ovals, Half Rounds, &c.

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## Stoves, &amp;c., at the Centennial.

THE OPEN STOVE VENTILATING CO.,

of New York, make an interesting exhibit of their  
specialty, "The Fire on the Hearth." The dis-  
tinctive feature claimed for "The Fire on the  
Hearth" stove is a drum or expansion cham-  
ber situated above an open fire, and so sur-  
rounded by a jacket as to provide an efficient  
air-warming and air-circulating apparatus, in  
combination with the traditional merit of fire-  
place radiation and ventilation. The "Fire  
on the Hearth" is, in fact, a double stove,  
the inner one being used to convey the gasses  
from combustion out of the room, while the  
space between the two serves for a  
capacious air-warming chamber that supplies  
the living room for respiration and bodily  
comfort. The utilization of heat by this  
method is said to be so complete that when  
the blower is off the stove, the smoke pipe is  
usually cool enough to bear the touch without  
discomfort, showing that the maximum amount  
of heat has been abstracted and distributed  
throughout the room. Remove the drum from  
this stove, which gives its superior air-warming  
power, and practically we have the old-fash-  
ioned Franklin. Place the blower *in situ*, and  
we have an ordinary close stove and portable  
furnace; when the fire is well ignited, remove  
the blower, and we have a cheerful and efficient  
warming and ventilating apparatus, which will  
meet the approval of sanitarians everywhere.

**JAMES SPEAR & CO.,**  
of Philadelphia, make a display of stoves  
which are well worthy of a careful exami-  
nation. The latest pattern is the Argus  
Anti-Clinker of 1876, which has been espe-  
cially improved and beautified for this  
year's trade. It possesses all the late im-  
provements applied to their anti-clinker grate; has  
the reversible flue, burnished edges and plated  
turnbuckles, and in proportions and style of  
ornamentation is very beautiful. Their Franklin  
Reflector is also of elegant appearance, and  
seems to meet with general favor. The advan-  
tages claimed for this stove are as follows: "It  
is entirely free from dust, the heat is not lost up  
the chimney, and the fire can be easily regulated.  
It does not throw out gas in a weak draft, and  
with the patented reflector, the heating quali-  
ties of the stove are increased 100 per cent.  
over any other open stove." The stove is  
also supplied with patent sliding doors,  
by which the annoyance of a loose  
blower is dispensed with. It is also  
supplied with their patent vibrating anti-  
clinker grate, which, we are informed, has  
never before been applied to this class of stove.  
The Anti-Clinker Calorific Cooking Stove is  
another of their inventions, and apparently is  
one of great value. Perforated brass doors  
are placed in the front of the stove above the  
fire doors, which are protected by two sliding  
cast iron doors closing between them and the  
fire chamber during the process of lighting the  
fire. When the stove has become sufficiently  
heated for baking the sliding doors are with-  
drawn, which permits the air to flow through  
the perforated brass doors, lighting the gasses  
and carrying the excessive heat away from the  
front, center plate and covers around the oven,  
thus thoroughly distributing and equalizing  
the heat around the oven, which, they claim,  
has never before been accomplished by any  
stove inventor or manufacturer. They also ex-  
hibit "The Silver Moon," "The Golden Sun,"  
and other stoves, and, by way of contrast, an  
old stove cast in Europe in 1759, imported by  
the house of Burgess, Yorktown, Va., and  
which was used in heating the room in which  
the articles of shrewdness to Cornwallis was  
agreed upon. They have also an open stove,  
the first ever used in this country—75 years  
ago.

**FULLER, WARREN & CO.,**  
of Troy, have a stove building, adjoining  
Campbell's Press Co., at the west end  
of Machinery Hall. Here they exhibit the  
Lauson furnaces, and Mr. Lauson himself  
is on hand to explain the details. Few men  
have studied the science of heating more  
closely than he, and the result of years of con-  
stant application has enabled him to present  
many valuable improvements. Being a master  
himself, he knows what is needed in work-  
manship, and will allow no imperfect heaters  
to go to the public. The flues are so arranged  
as to give a large radiating surface, where the  
air becomes thoroughly heated in passing  
through the furnace. Though intended for  
burning anthracite coal, they have been found  
to answer equally well for bituminous. It is  
made entirely of cast iron. Beside large heaters,  
Fuller, Warren & Co. have parlor furnaces, so  
arranged as to heat cottages. These are pro-  
vided with attachments for three pipes on the  
first floor and two on the second. They are  
claimed to be strong, and yet economical  
heaters. In order that they may be seen in  
operation, one parlor stove and one large heater  
in their building have fires in them, and there  
have been many days, when they were found  
quite agreeable, even in this month of June.

**J. G. COOZEY,**  
of Hyde Park, Mass., presents a "Cottage  
Kitchen," in which coal oil is the fuel used.  
The boiler is arranged in four compartments,  
one above the other, all covered with a con-  
densing dome. By properly adjusted openings  
the impregnation of one vegetable with the  
flavor of another is prevented, while the differ-  
ent stews or bolls deposit their several con-  
diments in the lower reservoir, where will be  
found when the cooking is over, a very palat-  
able soup. One lamp does all the boiling,  
broiling and steaming. Added to the above is  
an oven for baking or roasting, and for which  
another lamp is required. In order that the  
wick chambers may not become heated, they  
are provided with a reservoir, or water-jacket,  
that completely surrounds them. The stove is  
claimed to be economical, and it is certainly a  
very capital arrangement to prevent heating a  
kitchen in summer. For those who are obliged

to reside in close quarters the "Cottage Kitchen"  
will prove useful and healthful.

**THE BARSTOW STOVE COMPANY,**  
Providence, R. I., have an improvement that  
is certainly very desirable. It is an elevated  
hot closet with sliding doors. All cooks  
complain of doors swinging over their heads,  
and many an unlucky knock has been re-  
ceived thereby. Of course, no such acci-  
dents can occur here. Their portable range,  
entitled "Empress," is made of wrought iron,  
the rivets being driven hot, and the joints made  
perfectly gas tight. The advantage is an avoid-  
ance of danger from the unequal expansion of  
wrought and cast iron.

**H. G. GILES & SON,**  
of Troy, present very complete portable ranges  
and stoves. The appearance is attractive, and  
the philosophy of heating very effectually  
demonstrated. They have an anti-dust damper  
to be used while adjusting the fire; also a  
clearing grate by which the slag, slate, &c., can  
be let down into the ash-pit without shaking  
the grate or disturbing the fire. The heat can  
be regulated readily, and the fire requires very  
little attention when fairly started. Those who  
have used these stoves and ranges for some  
time appear to be well satisfied, and give them  
a very high character.

**ISAAC A. SHEPARD & CO.,**  
of Philadelphia, offer a fine display of ranges  
and stoves that have secured a high reputation.  
The reservoir can be removed from the stove at  
pleasure, and plates put on for six Butler holes  
on top, without cooling off the fire. The flues  
can be cleaned easily, while there are no extra  
dampers to be looked after. Their "American  
Range" deserves attention. It contains all the  
usual appliances, is readily managed, and keeps  
up a steady fire with a very small consumption  
of fuel. Great pains are taken to warrant all  
the products of this firm, and they have re-  
ceived high praise from those who have used  
their various stoves and ranges. In 1874 they  
were awarded a silver medal. They have, in  
addition to their Philadelphia factory, an  
equally large and flourishing establishment in  
the city of Baltimore. In both cities they em-  
ploy a large number of workmen.

**THE TUTTLE & BAILEY MANUFACTURING COM-  
PANY,**

of New York, have a large display of their  
elegant ventilators, screens, &c. Their vertical  
wheel register when placed in the flue, is turned  
by a pin; when upon the floor, by the foot.  
Their asylum register is turned by a key, so that  
the crazy people cannot play with it at pleasure.  
They also have shallow valve registers, to be  
placed in thin partitions. Their work will bear  
close examination, and is of the most creditable  
character. Among others, they have a variety  
of summer aprons for fire-places, and beautiful  
screens and pedestals finished in gold, marble  
and bronze.

**READ & COOPER**  
have their stove flues so arranged that the heat  
can be taken direct from the fire-box (in part or  
the whole), under or over the oven, as may be  
desired. By this contrivance the baking may  
be regulated to avoid any inequality in the  
under or upper crust.

**THE KITTREDGE CORNICE AND ORNAMENTAL  
COMPANY,**

of Salem, Ohio, have just finished a building of  
sheet metal, near the Photographic Building.  
It is 20x40 feet, and 28 feet high, with a dome,  
with double walls of galvanized and leaded  
sheet iron. The place is not yet open for dis-  
play, but will be in a few days. It is neat and  
highly ornamental. They are now putting up  
on the inside walls a very large display of their  
various moldings, cornices, window caps and  
sills. They claim that their building is cooler  
than any other upon the grounds, as the double  
walls protect the inner from too great heat.  
They can mold any pattern that may be sent  
them, with great facility, and at rates that are  
exceedingly low. The house is so constructed  
that it can be easily removed in bulk. Their  
works at Salem are quite extensive, and al-  
though the business has sprung into existence  
within the last five years, they find already  
plenty of work for from 200 to 300 hands. By  
the prices given for some work there can be no  
doubt of its cheapness. There is one strong  
recommendation in favor of sheet metal build-  
ings, and that is their safety from fire. On the  
walls they have busts of Washington and  
Franklin—good likenesses—in niches, all of this  
new industry. They sell the busts for \$10, and  
the niches at \$20, with the busts. In a week or  
two the firm will be ready for public exhibition,  
when they certainly will attract much attention.

**STUART, PETERSON & CO.**  
fully maintain their reputation in the extent  
and character of their exhibits. One portion of  
their space is entirely taken up with a display  
of hollow-ware of various kinds, which appears  
to meet with careful scrutiny and general ap-  
preciation, not only from the trade, but from  
all good housekeepers. Among the stoves,  
none is more prominent than the "Sunnyside,"  
and no stove is more generally to be met with  
in stores and dwellings than this same "Sunny-  
side," which is probably the best proof that  
could be given of its universal popularity and  
general excellence. They also exhibit the  
"Electric Light" parlor stove, the "Canopy"  
parlor stove and the improved "Junata"  
double heater. The larger sizes of the latter  
are specially adapted for heating stores, school  
houses, lecture rooms and churches. In cook  
stoves they exhibit the "Sunbeam" five-hole  
range, with patent movable shelf, patented in  
1875, the new "Sunbeam" range, with warming  
oven and movable shelf, and the "Barley  
Sheaf," a stove that has been, and still is, im-  
mensely popular. The last stove we notice is  
"The Rising Sun," which is not only neat and  
attractive in appearance, but very reasonable in  
price, and claims some very important improve-  
ments in construction.

**A. L. FANCHER & CO.,**  
New York, make a very fine display of mantel  
pieces. They have one of Mexican onyx, with

gold and silver bronze trimmings and silver  
plated grate, which has been purchased by the  
Emperor of Germany for \$3000, gold. Another  
very beautiful piece of work is in Grotto, with  
mirror, trimmed in black, valued at \$2500, and  
a third of Sarracolin, with mirror, trimmings  
in black—price, \$2200. The exhibits of this  
firm are of special elegance, and attract general  
attention.

**FISHER & BIRD,**  
New York, exhibit one of the most elegant  
mantel pieces in the whole building. It is of  
American statuary marble, carved and orna-  
mented most beautifully. The fire-place and  
hearth are nickel plated, with bronze fastenings.  
The effect is very fine, and the display is great-  
ly admired.

**THE WILLIAMS MARBLE AND SLATE MANUFAC-  
TURING COMPANY,**

of Philadelphia, make an extensive display of  
their specialties, which is at once interesting to  
the trade, and of fine appearance. The special  
line of this firm is in imitation marbles and  
woods, and the exhibits show how wonderfully  
successful they have been in reproducing exact  
counterparts of Italian, Grotto, Brocatelle,  
Sarracolin, Malachite, Spanish, Tennessee,  
Egyptian and other marbles. In woods they  
reproduce oak, maple, ebony, birch, Hungarian  
ash, mahogany, rosewood, tulip, and various  
Australian woods. A number of mantel pieces  
with low and high grates and tiled hearths are  
displayed, as well as parlor registers with fac-  
ings of the various marbles. Some of these  
are very beautiful, the enameling and decora-  
tion showing perfect skill and art of a high  
order. Among the marbles we noticed Spanish,  
a beautiful maroon, dark groundwork with fine  
veins of white; Plymouth Rock, ebony black  
with white veins; Lisbon, deep orange with  
very delicate veining, very brilliant and showy;  
St. Ann's, dove colored ground, clouded with  
black, mingled with white veins; Galway  
green, light green with black clouds and white  
veins, &c. Some of these are costly, others  
can be produced at low prices, the value of  
those exhibited varying from \$15 to \$1000 each.

**WILSON & MILLER,**  
of Philadelphia, also make a fine display sim-  
ilar in character to the above. Some of the ex-  
hibits are of great beauty; prominent among  
these we may mention a Belgian black marble  
mantel piece, with low grate in nickel and  
bronze. They also exhibit specimens of all  
the various marbles, and a small oblong slab  
of Mexican onyx of great beauty, just purchased  
by the Meriden Britannia Company.

**THOMAS S. DIXON & SONS,**  
Philadelphia, make a splendid display of low  
grates in various styles. Some of these are  
elaborately ornamented, and are greatly ad-  
mired. Chief among these may be noted a gas  
log fire place, soapstone back, nickel plated  
front, gilt border, tiled hearth and gilt fender;  
a low-down grate in nickel plate and gilt, a  
hexagon grate in nickel and Japan, and a wood  
fire place with ornamental tiled hearth and  
fender to match. These are only a portion of  
their exhibits, and give but a faint idea of the  
elegance of the display, which is one of the  
finest in its class.

**Manufacture of Dripping Pans by Ma-  
chinery.**

We have already noted that Messrs. Lewis  
Dalzell & Co., of Pittsburgh, had purchased  
the franchise of the Dayton Dripping Pan Co.,  
and had begun the manufacture of bread and  
dripping pans by machinery. All of the sheet  
iron used in their manufacture is the product  
of Messrs. Lewis Dalzell & Co.'s works, they  
having lately erected a very fine 20 inch mill for  
the special work of cold rolling sheet iron for  
the manufacture of these pans and for the gen-  
eral trade. This gives them a perfect control  
of the quality of stock used, and of the gauge  
of the iron, and secures a uniformity in the ma-  
terial, the advantage of which will be appar-  
ent to all interested.

The series of machines used in the manu-  
facture of these pans—the invention of Mr. Fogle-  
song—are very ingenious, and at the same time  
simple and effective. The iron is first cut into  
blanks the size necessary to make the pan re-  
quired, after which it is folded, not pressed,  
into shape, the action being entirely automatic.

The great advantage of the bending process  
over the stamping is too obvious to need much  
comment. The evils of this spots, wrinkles,  
etc., incident to stamping, are done away with,  
and the edges are simply folded over, leaving  
them as uniform and smooth as the sheet itself.  
This leaves no lurking places for the bread or  
drippings, and makes the labor of keeping the  
pans clean and sweet very slight.

The capacity of the works are two to three  
tons a day, but this can be very greatly in-  
creased.

**American Plows in India.**—The follow-  
ing remarks on the working of the two plows,  
says the London Agricultural Gazette, were em-  
bodied in a letter recently communicated to  
the Agri-Horticultural Society at Calcutta:

"I am very glad to answer your inquiry," says  
the writer, "as to our experience of the two  
plows which have been on trial. Both of them,  
the English and the American, were easily  
worked by a pair of ordinary bullocks; each  
turned up the soil to the depth of six inches, and  
there was no perceptible difference in the  
quality of the work turned out. But I imagine  
that no native farmer would care to own the  
English (iron) plow, when he could do the  
same work with the wooden American plow of  
simpler construction, and with a renewable  
point to the share. The points rapidly wear  
down in India, and the plowshare being made  
in one large piece, the alteration required is ex-  
pensive. In the American self-sharpening  
movable top not only lasts longer but costs  
little to replace."

The expression of such an opinion by an Amer-  
ican paper might not, perhaps, be of any particu-  
lar import; but appearing it as does in an  
English agricultural paper, it may be considered  
very complimentary to our manufacturers of  
plows.

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Pig and Manufactured Iron, Steels, Limestone,  
Clays, Slags & Coal for Practical Metal-  
lurgical Purposes.

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This Laboratory was established in 1866, at the instance of a number of practical iron-masters, expressly to afford prompt and reliable information upon the chemical composition of the substances above mentioned, for smelting and refining purposes. The object being to make it at once a convenient, practically useful, and comparatively expensive adjunct to the Furnace, Forge and Rolling Mill.

## CHARGES TO IRON WORKS.

For determining the per cent. of Pure Iron in an ordinary Ore..... \$4 00  
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For each additional constituent of usual occurrence..... 1 50  
For those of unusual occurrence or difficult to determine, the charge must necessarily depend upon circumstances  
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For the per cent. of Carbonate of Lime, and Insoluble Silicious Matter in a Limestone..... 10 00  
For each additional constituent..... 3 00  
For the per cent. of Water, Volatile Combustible Matter, fixed Carbon, and Ash in Coal..... 12 50  
or determining the constituents of a Clay, Slag, Coke, or of an Ash the charges will correspond with those for the constituents of an ore.  
For a written opinion or letter of instruction the charge must necessarily depend upon circumstances.  
Printed instructions for obtaining proper average samples for analysis furnished upon application.

## WALLACE &amp; HUMPHREY,

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Special attention given to analysis of Iron and Steel.

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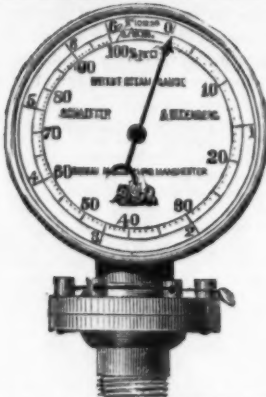
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Flat Bars up to 6x2. Rounds and Squares up to 4 inch, Ovals, Half  
Ovals, Half Rounds, Box Iron Cylinder Bars, Plow Beam Iron, &c. Also,  
Hoop, Band, Horse Shoe and Shafting Iron of superior quality. A full assort-  
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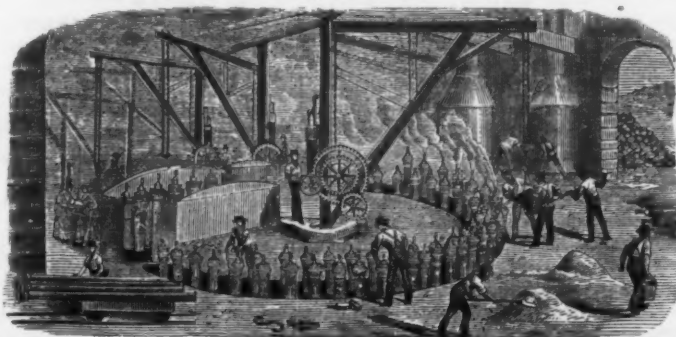
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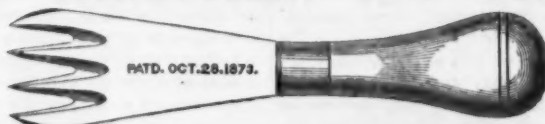
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THE HARDWARE TRADE are hereby cautioned against an imitation of our American Ice  
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plated and calculated to deceive. Our chisels are made of the best cast steel and warranted.

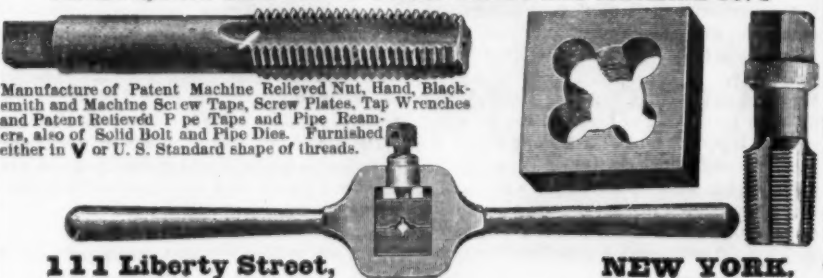
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Of all Patterns and of uniform quality, unsurpassed for strength and wear, and of any required length.  
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The annexed cut shows one of the many  
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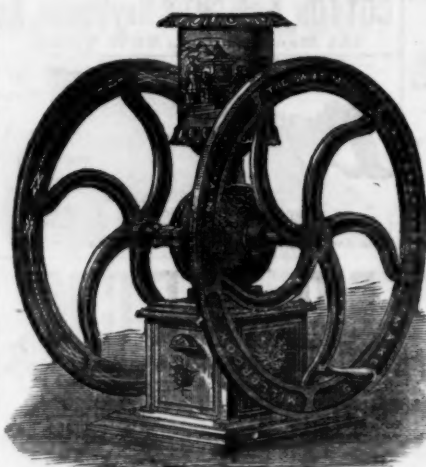
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Capable of controlling with the utmost accuracy the motion of a watchman or patrolman as the same  
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best lever watch. It requires no fixture or wire communicating from room to room, as is the case with the  
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ment will, in all cases, be warranted perfect and satisfactory.

CAUTION.—The public are notified that in my suit against Imhäuser & Co., of New York, a decree  
was made in my favor, June 10, 1874.  
Proceedings have been commenced against said Imhäuser & Co., for selling clocks contrary to the  
order of the Court, and especially the clock with a series of springs in the cover, and marked "Patented  
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**And GENERAL HARDWARE**

The attention of our old Customers and the Trade generally is invited to our new Illustrated Catalogue just issued, comprising a full assortment of our well known staple goods: Butts (Drilled and Wire Jointed), Thumb Latches, Sash, Upright Screw and Side Pulleys, Wardrobe and Harness Hooks, Draw Pulls, Nut Crackers, Cork Screws, &c., &c. Also several new and attractive styles of Fancy Hardware, at prices to suit the times.

Our new Patent Fancy Open Work Cap Butt, with Ornamented Knuckle, in Real and Imitation Bronze, and our Nickel Plated Cap Butts, with concealed Screws, are the handsomest in the market, and are attracting much attention. While making plain and japanned goods a specialty, we are prepared to meet the increasing demand for ornamented bronze and nickel plated House Trimmings. Goods packed in boxes or bundles, as may be preferred. For catalogue and price list address

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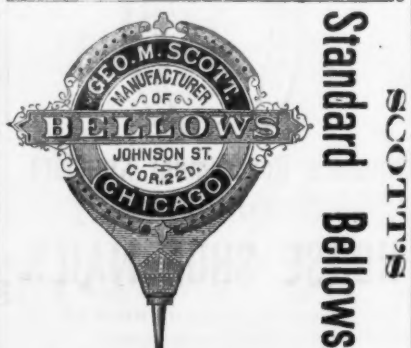
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Flooring, Siding, Shingles, Lath and Fence Posts.

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For all purposes for which Tape Measures are required.

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FINE TEMPERED STEEL SPRINGS.  
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**Pad Locks,**

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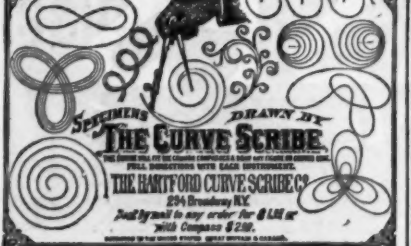
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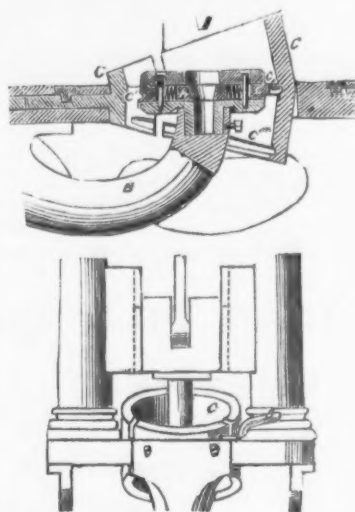


### New Patents.

We take the following abstract of new patents, recently issued, from the official record.

STOVE PIPE ELBOW MACHINE.

To John S. Lugg, Springfield, Ohio.—May 16.—The overlapping edges of stove pipe elbow sections are beaded and joined together.



1. The horn B, supporting the expanding die and the elbow as the sections are successively attached.

2. The sectional clamp with groove C<sup>2</sup> C<sup>3</sup> arranged in relation to one another.

3. In combination, the sectional clamp with groove C<sup>2</sup> and sectional expanding die E, with peripheral convexity E<sup>2</sup>, for forming the bead, and intermediate space E<sup>3</sup>, with recess for forming the head on the rivet.

4. In combination, the recessed sectional clamp, ribbed sectional die, and plunger, for expanding the die to form the head and unite the sections of the elbow.

5. The combination of the horn and the sectional die with the sectional clamp and plunger.

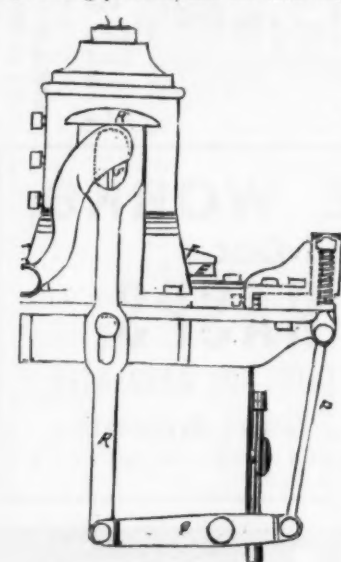
6. The clamp C, having its upper edges beveled to correspond with the angle of the sections of the elbow.

STOVE PIPE—ELBOW BLANK MACHINE.

To John S. Lugg, Springfield, Ohio.—May 16.—A portion of the blanks is punched from a sheet metal strip, which is then passed forward and the remaining strips cut off.

1. In combination, the die plate C and reciprocating punches E, and the shears O O', for cutting a sheet of metal into strips or sections without waste.

2. The combination of the crank shaft and reciprocating punches, and the shear blade O,



rod P, walking beam Q, slotted pitman R R', and pin S.

3. In combination with a cutter plate C, constructed with a series of openings, as shown, and the head plate F, carrying a series of correspondingly formed punches E, arranged to cut a sheet into sections of the elbow pipe across the entire width of the sheet at one movement of the plunger, acting on the sheet while held in fixed position by a stop on the cutter plate.

177,322.—Gas Burner.—James M. Clark, Lancaster, Pa.—May 16.

Gas is supplied on opposite sides of an adjustable wick.

177,334.—Hydro-Carbon Stove.—Abner B. Hutchins, Brooklyn, N. Y.—May 16.

177,335.—Water Cooler.—C. B. Hutchins, Ann Arbor, Mich.—May 16.

Wooden case is lined with paper; the wooden frame put on to it; the whole is inverted; the stone slabs set into grooves in the frame. The composition is poured in until it covers the bottom slab, when the paper lined wooden bottom is put on. Cover is filled in same way, the stone slab being screwed on.

1. The combination of an outer wooden case, an inner lining of stone, and intervening layers of paper, and of a non-conducting and watertight composition.

2. The non-conducting and water-tight composition, consisting of rosin, tallow or grease, and a powdered or fibrous non-conducting material.

177,417.—Lamp.—Stephen S. Newton, Binghamton, N. Y.—May 16.

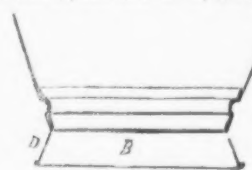
The safety tube is made of wire coiled spirally.

177,435.—Adjustable Eccentric for Pumps.—Benj. F. Spry, Hartford, Iowa.—May 16.

The eccentric is slotted from center to rim, and has notched flanges on the sides of the slot, in which notches a pin passing through the shaft engages, controlling the measure of eccentricity to the shaft. The eccentric works in a slotted yoke attached to the pump rod.

COAL SCUTTLE.

To A. F. Burnett, Chicago, Ill.—May 23.—1. In a coal scuttle, the bottom B, stamped from



a single piece of sheet metal, with flaring and diverging sides, and provided with a hollow bead or wedge.

2. The bottom B, in combination with the scuttle A, made with diverging and flaring sides, and the foot D, flaring and diverging in the opposite direction.

PUMP.

To Wm. D. Trahern, Rockford, Ill.—May 23.—The pump is suspended from the surface

covering, which admits the piston to play vertically in the axis of the pump, thereby obviating any lateral action of the pump rod.

1. The twin air chambers, provided with stuffing box and suitable connection for the reception of the suspension pipe b, water pipe c, and discharge pipe G, cast in one piece.

2. In combination with the air chambers, as described, the water pipes C and E, and pump barrel D.

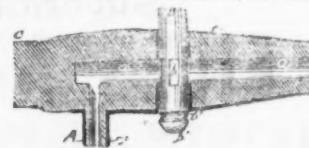
3. In combination with the air chambers, as described, the discharge pipe G, with delivery branches n and o, fitted at the junction of the several branches with a three-way faucet, p, operated by rod r.

4. The suspension pipe b, in combination with the pump base a and stuffing box e by yoke connection, with pump thereto attached, for the purpose of suspending the pump from the surface covering, and to admit the piston rod to play vertically in the axis of the pump to prevent lateral vibration of the suspended parts.

5. In combination with the pump base a, the adjustable cap k, fitted with guide arm l, fulcrum link m, and lever handle f, for the purpose of adjusting the lever handle to be operated from any convenient position.

FAUCET.

To Anton Toneska, Iowa City, Iowa.—May 23.—The faucet herein described, consisting of



wooden body A, wooden spout A', spigot B b, spring b', and nut b'', and metal coverings or bands C C' C''.

177,620.—Cap or Stopper for Can Spouts.—William Collins, Niagara Falls, N. Y.—May 23.

The end of the spout is provided with a thimble form cover, having within a flexible pad, the cover being held in place by a spiral spring on a hand rod, pressure against which permits the flow of oil.

177,624.—Stove Covering.—Harvey P. Daggett and Richard R. Keith, Flint Hill, Mo.—May 23.

The odors are carried, through openings in the drum and perforations in the pipe, to the exit flue.

177,624.—Gas Regulator.—John R. Hall, Philadelphia, Pa.—May 23.

The shaft carrying the cam can be operated from the outside, to increase or decrease the tension of the spring which presses the valves downward.

177,646.—Hose Pipe Nozzles.—Rufus Kendrick, Wakefield, Mass.—May 23.

The nozzle is intended for insertion in the hole of a partition, so as to put out fire in places impossible to reach by the ordinary nozzle.

177,647.—Water Closet Bowl.—Thomas G. Knight, New York, N. Y.—May 23.

177,673.—Pipe Cutter.—Austin C. Wood, Syracuse, N. Y.—May 23.

A hinged sleeve, provided with centering screws, movable independently of the cutter, is adjusted about the pipe. A jointed collar, formed with ratchet teeth and cutter head, is encircled by a jointed ring, inclosing the teeth, and carrying a pawl. The collar is revolved about the sleeve.

The following design was duly patented in the United States Patent Office: 3289.—Steam Radiator.—George W. Blake, New York, N. Y.—May 16, 1876. Term of patent, 14 years.

The following trade-marks were duly registered in the United States Patent Office: 2603.—Stove.—Greer & King, Dayton, Ohio.—May 23.

"word 'Tuscola'."

3711.—Hose for Pumps, Engines, &c.—Wannan Manufacturing Company, Boston, Mass.—May 23.

"One or more threads or yarn of blue color woven into the fabric of which the hose is composed, and running lengthwise or parallel with the axis of the hose, in connection with the word 'Blue.'"

# USE THE BEST.



**Pawtucket, R. I.**

The American File Company have the exclusive right to use the Bernot process for cutting files. By this method all the advantages of hand cutting are secured, together with an accuracy unattainable in hand work. They are the only manufacturers who employ machinery for testing files and steel.

Goods of all known manufacturers have been repeatedly tested, and interesting tables have been compiled showing the working qualities of files made by different makers, and of files made from different steels, and with various shapes and angles of tooth. They have thus obtained the manufacture of files to an exactness and perfection with a uniformity of result, as they believe, never before attained. No file, foreign or domestic, that they have ever tested, has equalled the performances of their own goods taken at random from their stock. Their machines are capable of the most delicate adjustment, and can produce the very finest work known to the trade. Special files made to order. Prominent file manufacturers are having their best goods from our works.

Price lists and information furnished on application.

**AMERICAN FILE CO., Pawtucket, R. I.**

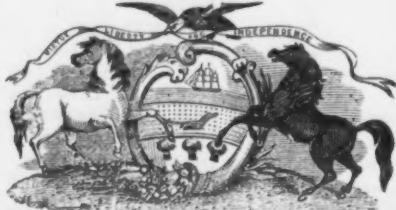
## THE BEST IS THE CHEAPEST.

McCaffrey's Standard American Hand Cut Files and Rasps are warranted to do more work than any other files and rasps in the market.

SILVER MEDAL

TRADE MARK.

HIGHEST PREMIUM.



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No. 1732, 1734 & 1736 North Fourth St., Phila.

Messrs. ARNOLD & CO., 310 California St., San Francisco, Sole Agents for the Pacific Coast.

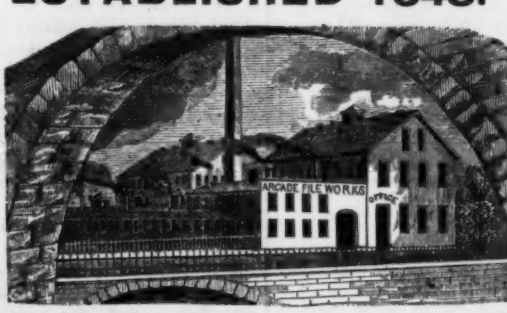
**ESTABLISHED 1848.**

C. T. DRAPER & CO.

Sing Sing, N. Y.

Manufacturers of SUPERIOR

HAND CUT



FILES and RASPS

Made from Best

ENGLISH CAST STEEL.

Quality guaranteed by written warranty

when required.

## AUBURN FILE WORKS,

Superior Hand-Cut

## FILES AND RASPS,

MADE FROM IMPORTED STEEL. EVERY FILE WARRANTED.

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**Heller & Bros.**  
We invite the attention of the trade to our Celebrated American

**Horse Rasps and Files,**  
made from the very best American Steel, all cut by hand, and warranted to give entire satisfaction. If requested, we will send sample lots, to be returned or held subject to our order, free of all charges, if not found as represented. All Rasps not stamped as the patented incorporated trade mark are not genuine. Sold by Hardware dealers generally.

## FILES & RASPS,

Best Cast Steel.

**HAND-CUT.** Manufactured by

**JOHNSON & BRO.**

No. 1 Commercial Street, Newark, N. J.



**Putnam's Government Standard FORGED HORSE SHOE NAILS.**

Manufactured from the best of NORWAY Iron, and warranted to give entire satisfaction.

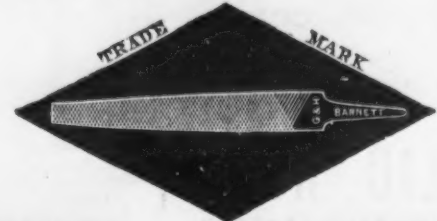
**S. S. PUTNAM & CO., NEPONSET, MASS.**



**ROMER & CO.,**  
Established 1857. Manufacturers of Patent Scandinavian or Jail Locks. Brass Pad Locks for Railroads and Switches. Also, Patent stationary R. R. Car Door Locks. Patent Piano and Sewing Machine Locks. 141 to 143 Railroad Avenue, NEWARK, N. J. Illustrated Catalogue sent on application.

## Black Diamond File Works.

Send for Illustrated Price List.



Send for Illustrated Price List.

**G. & H. BARNETT.** 39, 41 & 43 Richmond St. Phila.

**LINFORTH, KELLOGG & CO.,**

Sole Agents for the Pacific Coast, 3 & 5 Front St., San Francisco, Cal.

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**THOS. TAYLOR,** 43 Chambers St., N. Y., Agent for N. Y. and N. E. States.

**Established 1816.**

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SOLE AGENTS FOR

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## FILES AND HORSE RASPS,

And Importers of

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**W. J. Davies' Sons' London Emery Cloth, HUBERT'S FRENCH EMERY PAPER.**

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**WALSH, COULTER & FLAGLER, Agents,**

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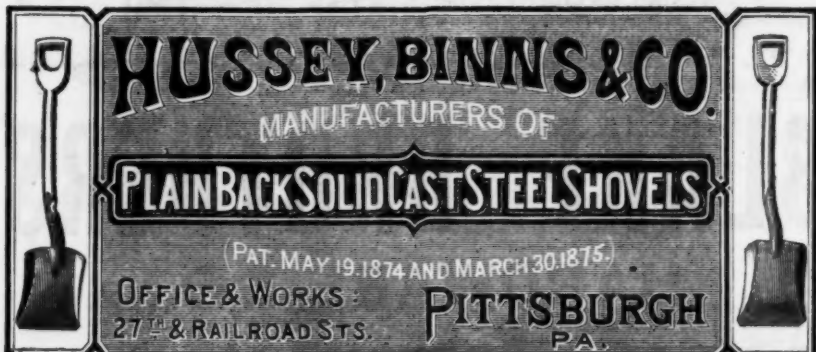
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187 Tenth Street, Williamsburg, New York.

All descriptions of Files made to order. Price List mailed on application.

Established 1863



**GEORGE T. RICHARDSON.**

**FRANK H. SCUDDER.**

## Middleboro' Shovel Co.,

MANUFACTURERS OF

**Solid Cast Steel (Antrim) Cast Steel and Iron Shovels, Scoops and Spades.**



OFFICE AND SALESROOM, 63 Oliver Street, Boston.

**WORKS, Middleboro', Mass.**

**J. CLARK WILSON & CO., New York Agents, 81 Beekman Street.**

## GOLD MEDAL

## Non-Extensible Razor Belt.

PATENTED JULY 25, 1871.

RE-ISSUED MAY 13, 1873, and JUNE 9, 1874.

In this Strap the liability of the leather to stretch and become loose and porous is prevented by the use of a patented non-extensible base, which supports the leather and secures

**PERMANENT ELASTICITY.**

We make this style with single rod, double rod, and wood frames, and intend that it shall, in quality compare favorably with our other well known brands.

**BENJAMIN F. BADGER & SON, Manufacturer**

Badger Place, Charlestown, Mass.

# HISCOX FILE MANUFACTURING CO.

WEST CHELMSFORD, MASS.

## FILES & RASPS

OF EVERY DESCRIPTION, ALSO ALL KINDS OF

MACHINE

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VENEERING

PAPER OR

LOG WOOD

TRIMMING

## KNIVES

HISCOX FILE MANUFACTURING CO

WEST CHELMSFORD, MASS.



## A. FIELD & SONS,

TAUNTON, MASS., Manufacturers of  
COPPER & IRON TACKS, TINNED TACKS,

SUPERIOR SWEDS IRON TACKS, for Upholsterers' Use, Saddlers' Supply, Card Clothing, etc., etc.

American and Swedes Iron Shoe Nails,

Zinc and Steel Shoe Nails, Carpet, Brush and Gimp Tacks, Common and Patent Brads, Finishing Nails, Annealed Trunk and Clout Nails, Hob and Hungarian Nails, Copper and Iron Boat Nails, Patent Copper Plated Tacks and Nails.

Fine Two Penny & Three Penny Nails, Channel, Cigar Box & Chair Nails, Leathered Carpet Tacks, Glaziers' Points, Etc.

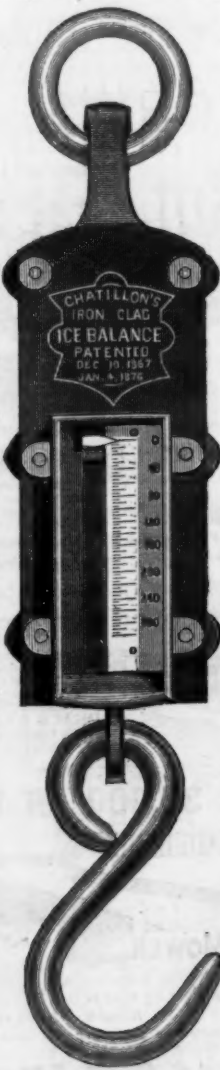
OFFICES AND FACTORIES AT TAUNTON, MASS. WAREHOUSE AT 78 CHAMBERS STREET, N. Y.,

where may be found a full assortment of Tacks, Brads, &c., for the accommodation of the New York Wholesale and Jobbing Trade.

Any variations from the regular size or shape of the above named goods made from samples, to order.

**Hoisting Machinery**  
Manufactured by  
Crane Bros. Mfg. Co.,  
CHICAGO.  
COOKE & BEGGS, Agents, 16 Cortlandt  
Street, New York.

**IRON CLAD ICE BALANCES.**  
200, 300 and 400 Lbs. Capacity.  
Correct, Compact, and Durable, not liable to get out of order. SUPERIOR to any other  
ICE BALANCE in the market.  
Manufactured only by JOHN CHATILLON & SONS, 191 & 93 Cliff St., N. Y.



NO MACHINERY.  
Cannot get out of order.  
TRADE MARK  
SELF COILING  
SHUTTERS  
ABSOLUTE PROTECTION.  
Simplicity of Action.

**CLARK & CO.'S**  
PATENT  
Self-Coiling, Revolving!  
NOISELESS

**STEEL SHUTTERS**

FOR  
Store Fronts & Rear Windows.  
FIRE AND BURGLAR PROOF.  
Also, SELF-COILING  
Wood Shutters

In various kinds of wood, suitable for Store Fronts,  
Private Houses, Offices, and School Partitions.

**The Best & Cheapest Shut-  
ters in the World**

All Real Estate owners are invited to inspect them at  
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162 & 164 West 27th Street, New York.  
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**PREMIUM  
Mechanics' Tools,  
COOK'S  
Boring Implements**

Price List and Discount Sheet furnished  
on application.

Chisels, Gouges and Drawing Knives of all kinds, Screw Drivers,  
Screw Driver Bits, Cook's and Douglass Mfg. Co.'s Augers &  
Bits, Wood and Metal Head Gimlets, Improved Hollow  
Augers, Blake's Patent Extension Bits,

Boring Machines, Chisel Handles, Wood Boxes, Tool Chests, &c.



## THE HURRICANE FORGE.

(PATTERSON'S PATENT.)

Also Stationary Forges.

Large Size, superior to stone or brick. Can be used with bel-  
lows or fan. Send for prices and further information to

**GEORGE PLACE, General Agent,**

121 Chambers & 103 Reade Sts., N. Y.



**S. H. & E. Y. MOORE,**  
68 Lake Street, CHICAGO, ILL.,

AGENTS FOR

**PROVIDENCE TOOL COMPANY, PROVIDENCE, R. I.**

Thrashing Machine Teeth, Cold Pressed Nuts, Chain Links, Ship Chandlery, &c.

**THE READING BOLT AND NUT WORKS, READING, PA.**

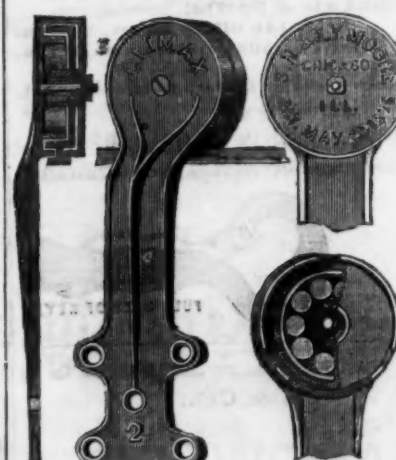
Hot Pressed Nuts, Machine Bolts, Lag Screws, Skein Bolts, Bolt Ends, &c.

**WM. H. HASKELL & CO., PAWTUCKET, R. I.**

Gimlet Point Coach Screws, Bolts, &c.

**FALLS RIVET COMPANY, CUYAHOGA FALLS, O.**

Norway Iron Rivets.



## "CLIMAX" Barn Door Hangers,

Manufactured and for sale by

**S. H. & E. Y. MOORE,**

68 Lake Street, Chicago, Ill.

The wheel is acted upon directly by the rail. The  
hub of this wheel revolves within chilled iron rollers.  
The difference between the diameter of the  
wheel and the diameter of the hub gives the leverage  
gained. The hanger has the advantage of this lever-  
age in addition to that obtained from the use of  
anti-friction roller bearings, and in this respect, as  
well as in others apparent on examination, is superi-  
or to any yet offered to the trade. It requires no  
oiling.

IT COMBINES  
SIMPLICITY, EASE OF ACTION, STRENGTH,  
DURABILITY, BEAUTY OF DESIGN.

FOR SALE BY

J. Clark Wilson & Co., New York.  
Biddle Hardware Co., Philadelphia.  
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J. H. Work, Boston, Mass.  
Hamilton & Mathews, Rochester, N. Y.  
Homer Foot & Co., Troy, N. Y.  
J. M. Warren & Co., Springfield, Mass.  
Barker, Whitaker & Co., Providence, R. I.  
Perin & Gaff Mfg. Co., Cincinnati, O.  
McCombs, Caruth & Byrnes, St. Louis, Mo.  
C. E. Walbridge, Buffalo, N. Y.  
McCarthy & Redfield, Syracuse, N. Y.  
John R. Keiser, Jr., Baltimore, Md.  
F. S. Bradley & Co., New Haven, Conn.  
Maurice E. Vele, Albany, N. Y.  
Geo. M. Way & Co., Hartford, Conn.  
Loomis, Barnett & Prie, Dayton, O.  
And the trade generally.

## BUSINESS ITEMS.

### MAINE.

The Kennebec Wire Works, in Hallowell, are located a short distance west of the highway and the railroad. Their factory is 64 feet long, 44 feet wide, and three stories in height; annealing shop, 30x44 and two stories; blacksmith shop, 20x40 feet. Their machinery is new and of the best approved pattern, driven by two Upham diagonal turbine wheels, 12 and 15 inch severally in diameter, giving a force, under a full head of water, estimated at 55 horse-power. They also have in the building a steam engine of 15 horse-power for occasional use. They are now giving employment to 13 hands, and turn out over four tons of wire per week. They make a great variety of wire—bright, coppered and tin plated—making a specialty of card-clothing wire, heddles, reeds, &c., for which they have established a high reputation. Their goods are first-class, all of which are manufactured under the personal supervision of their efficient agent, Mr. J. M. Smith, who has had an experience of 20 years. The company is composed of J. W. Stickney, S. Page, H. F. Harding and J. M. Smith.

### NEW YORK.

The Cedar Point Furnace has had a little experience that may be of value to furnace managers. A short time since the furnace began to work badly, and soon a positive scaffold was the result. The gas was immediately turned into the stoves (Whitwell), and the boilers fired with coal. The pyrometer soon showed 1600° F., and the blast was increased to 13½ pounds. Under such heroic treatment even iron yielded, and the furnace straightened itself out and went on.

Burden, of Troy, is busy on horse shoes. He is endeavoring to make his sales for the year. The past week the horse shoe mill has been idle, putting in a Corliss engine in place of the water-wheel.

The Albany and Rensselaer Mill, at Troy, is busy on steel.

Cedar Point Furnace is in blast and doing well, making about 50 tons No. 1 iron per day.

The Union Iron Works, at Buffalo, now employ about 300 men in place of 1000 a few years ago.

The Black Rock Mill, Buffalo, is running steadily.

The Premier Furnace, Buffalo, is out, with no prospect of blowing.

### NEW JERSEY.

The Singer Mfg. Co., of Elizabeth, gave their employees, to the number of 3000 to 4000, a free excursion to the Centennial on Thursday last.

The Morris County Machine and Iron Co., at Dover, make a specialty of apparatus for the transmission of power by means of wire ropes. This information will be of interest just now, as it is frequently asked by correspondents. The company also manufacture steam engines, mining machinery, iron and brass castings, and forgings of all descriptions.

### MARYLAND.

The mill at Cumberland is running steadily.

### PENNSYLVANIA.

The Bush Hill Iron Works, Philadelphia, are building a blowing mill for the Pennsylvania Steel Works, Harrisburgh.

The firm of Wm. & Harvey Rowland, Philadelphia, are now slitting Norway iron into nail rods, and finishing them about as smooth and straight as rolled rods, having no burr on the edges. Each rod is full to size, so that there is no waste to the consumer. The price for the improved rods has not been advanced.

The Warwick Furnace, at Pottstown, is again in blast, having had to blow out after a short blast.

The Pottstown Furnace is in blast.

The Pottstown Iron Co. have had trouble with their nailers, and are now making efforts to fill up with new men. At present the nail mill is idle, but the other portion of the mills is in operation.

The only furnaces in blast at Reading are the two Keystone furnaces of Messrs. Bushong. These are sold ahead for a month.

The two furnaces of the East Penn Iron Co. at Lyons are working.

The Leesport Furnace is out.

The Ringold, St. Clair and both Swedes furnaces are in blast.

Atkins has two furnaces in.

The Temple Iron Co. have nearly completed the improvement at their furnace rendered necessary by the fire of a few months since. They have put up a new hoist, new engine, new stockhouse and raised the stack. They are considering the propriety of blowing in. A bid has been made for iron, and if successful, they will blow in.

Mr. William Mercer, of Christiansa, foundryman, in the employ of Isaac Brodmail & Sons, is the inventor and patentee of an improvement in the turbine water-wheel, which is a very valuable one. Its chief points are a combination of the buckets so as to require less water, less expense for repairs of breakage, and more power furnished, according to size. He proposes to vigorously push the manufacture and sale of his improved wheel.

A new car truck is at present being constructed at the car shops of Messrs. Billmeyer & Smalls, in York, which is the invention of a gentleman by the name of John M. Brosius. Each axle under this truck is severed in the center, instead of extending from wheel to wheel. The inner ends of the axles each work in a box, and are independent of each other, so that in running around a curve each wheel will run the exact length of the track, and thus

prevent slipping. This may have been an invention of Mr. Brosius, but it has been invented a score of times before, and, if we mistake not, such axles are in use in Russia at the present time.

The Reading Rail Mill have been working during the last month for the Texas Pacific Railroad. This is a part of the 12,000 ton order given by this road, 6000 going East and 6000 West. Atkins Bros., Waterman & Beaver, and Rome, in addition to the Reading, got portions of this order.

Hugh E. Steele, of the Laurel Iron Works, Coatesville, has associated with him Joseph M. Downing and John D. Steele as partners in the manufacture of boiler, flue and tube iron, under the firm name of Hugh E. Steele & Co.

The Sheridan Furnace is making 175 tons per week.

The oldest furnace in Pennsylvania is the old Pennsylvania.

Mr. Eckley B. Coxe has just tried the Wootton process of using slack, described on another page, with complete success.

At an early hour on Saturday morning last a large blast furnace at the works of Mr. James Lanigan, a short distance above Norristown, caved in, involving a loss of about \$35,000. The furnace was constructed of sandstone, some 15 years ago, and has for some time past been considered in an unsafe condition, although being worked daily. On Friday evening Mr. Lanigan notified the workmen to draw off the melted ore. While his men were thus engaged a portion of the front wall gave way, which was followed shortly after by the caving in of the furnace and stack, burying beneath the debris many tons of molten metal. No one was dangerously wounded, one man being slightly injured by a brick when the first crash commenced.

The Allentown Iron Company will probably blow out all the furnaces they now have in blast at no distant day. This company have a large stock of pig iron on hand.

The Riddlesburg Furnace has blown out.

The mills at Conshohocken are making full time, and are well supplied with orders.

Hoopes & Townsend, Philadelphia, manufacturers of nuts, bolts, etc., are having a good trade at fair prices. This firm is one of the largest manufacturers of these goods in the country, and make as large an assortment.

DOM PEDRO AT THE KEYSTONE PORTABLE FORGE COMPANY'S WORKS.—On Saturday morning last the Emperor of Brazil paid his first visit to a Philadelphia manufacturing establishment. His early arrival (seven in the morning), and the close personal and critical examination which he made, shows him to be of thorough business habits, and accustomed to rely upon his own judgment. The emperor had seen these forges in various places, and showed his appreciation of them by leaving an order for a line to be shipped to Brazil. As this visit was spontaneous on the part of the royal visitor, it is a distinguished honor to the well deserved merits of a Philadelphia industry. This company has been in existence five years, and they already make shipments of their goods to all parts of the world. They are now engaged filling a large order for the United States government for forges for use in the army and navy.

The firm of J. T. Bailey & Co., Philadelphia, received an order last week for 40 tons of twine from a firm in Dublin, Ireland.

The puddling furnace of Messrs. Noble & Bro., Tioga Rolling Mills, Germantown Junction, is now completed, and operations will be commenced immediately.

### PITTSBURGH AND VICINITY.

Work is progressing rapidly at the Dunbar Furnace. This furnace, as rebuilt, will be one of the most complete in the country, having all the latest improvements, including the Whitwell stoves. Mr. Pechin describes a good deal of credit for his readiness to adopt any new idea that promises to be valuable.

Thos. S. Blair has operated, at his works, on heating clender with an alkali, and has succeeded in making an iron that has been rolled into sheets.

The heaters and rollers, on the 12th, voted not to work old rails, fugots, or other iron made outside of their mill during the time the puddlers' wages are unsettled.

The rollers and heaters, gave Carnegie, Bros. & Co. notice that they would not work old rails.

Messrs. Riter & Connolly, of Pittsburgh, are erecting the new buildings for the Benwood Iron Works, at Wheeling, W. Va.

Not more than a third of the mills in Pittsburgh have signed the scale demanded by the puddlers.

Messrs. Hussey, Wells & Co., though they agreed to pay the puddlers the price demanded, refused to sign the scale, and their furnaces are cold. Victory is not so ready to perch as was claimed.

### INDIANA.

The nail mill at Green Castle is in operation again.

The Wabash Rolling Mill, Terre Haute, are contemplating building a nail mill.

The Brazil Furnace propose stocking their company, and have filed articles of association with a capital of \$150,000 in 50 shares. They contemplate a rolling mill.

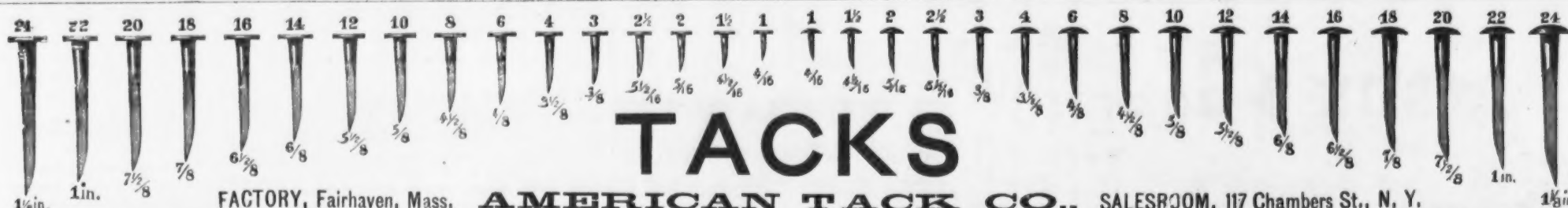
### OHIO.

It is stated that iron was first made in Ohio at Zanesville in 1786 or 1787, by the owners of the Jacob's Creek Furnace.

The Enterprise Mill, Cartwright, McCurdy & Co., Youngstown, have signed the scale.

### MICHIGAN.

The Wyandotte Rolling Mill are using the Hay process of purifying iron. They are rebuilding their plate mill.



FACTORY, Fairhaven, Mass.

AMERICAN TACK CO., SALESDROOM, 117 Chambers St., N. Y.

Upholstery, Gimp, Brush, Card, Pall and Cheese Box Tacks; Leathered, Tinned and Iron Carpet Tacks; Bright and Blued Finishing Nails; Cigar Box and Chair Nails; Trunk and Clout Nails; Brads, Patent Brads, Copper Tacks and Nails; Iron, Zinc, Steel and Copper Shoe Nails; Polish, 2d and 3d Fine Nails; Roofing and Slatting Nails; Roofing Tacks, Tinned Tacks and Nails of every variety. Also, Bright and Japanned Lining and Saddle Nails, Tufting Buttons and Nails of any color. Any size or style of Tack or Nail made to sample. Orders sent to either Factory or Salesroom will receive prompt attention.

## LEIGHTON BRIDGE AND IRON WORKS,

Rochester, N. Y.

Wrought Iron Riveted

Lattice Railroad

AND

HIGHWAY BRIDGES.

Wrought Iron

WATER PIPE,

The most economical and durable Pipe manufactured for Water Works, Oil Lines or Gas Mains.

General Riveted Work

Orders solicited from Civil Engineers and Contractors.

[Accompanying engraving represents the Sprinfield Bridge, built by the Leighton Bridge and Iron Works.]

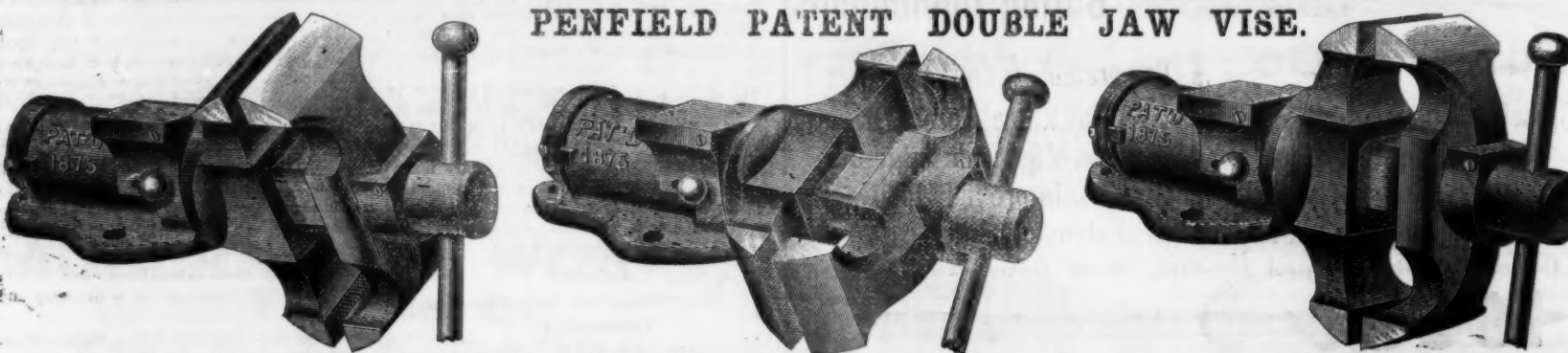


SPRING PERCH CO., Bridgeport, Conn.

Established 1843. Manufacturers of FIRST QUALITY

## SPRINGS & AXLES

And Beer's Patent Curtain Rollers, Concealed Hinges, Etc., Springs of any pattern made to order. Send for Circular and Price List.



We call your attention to a new form of Patent Vise, possessing double jaws, which may be so adjusted as to hold an object at any desired angle with great firmness. This arrangement offers great advantages over any other Vise, as the operator can place his work at any angle best suited to his convenience. On the standard there is a spring bolt, which, when it is desired to adjust the jaws, is drawn back, and the jaws are set at any desired position. The face of one pair of jaws are rounded, and those of the other pair are smooth, to suit different kinds of work. The whole construction of the Vise is such as to prevent any chips or filings entering the working parts. Into the end of the standard is placed the flange nut, into which passes the Vise screw, which is on a direct line with the flange nut, which is held in its position at the rear end of the standard by two steel screws holding it firmly in its place. Send for Circular and Price List.

J. CLARK WILSON &amp; CO.,

Manufacturers and Jobbers of Hardware,

81 Beekman Street, New York. P. O. Box 2355.

AGENTS FOR

MRS. COLE'S NEW PATENT

Improved "Pony" Fluting Machine.



We have much improved the "Pony" Fluter by inserting a brass spiral spring under the upper roller nearest the crank, thus compelling the rollers to flute the work perfectly true and even.

The New Pony Fluter has all the advantages of the old style Fluting Machine—self-acting lever, etc.—and in addition has the clamp, which is always ready for adjustment to the table. The lever is attached to the machine parallel with it, and is therefore never in the way.

It is the best and cheapest machine now on the market.

4 inches.....each, \$4.75 6 inches.....each, \$5.50

5 ".....each, \$5.00 7 ".....each, \$6.00

Discount 25 %.

MALTBY, CURTISS &amp; CO.,

34 READE STREET, NEW YORK, Manufacturers of

Maple Faucets with Metal Keys.

The best Faucet made. Warranted to stay tight.

CAPEWELL'S GIANT NAIL PULLER, THE NATIONAL ICE CHISEL, THE NOVELTY ICE BREAKER.

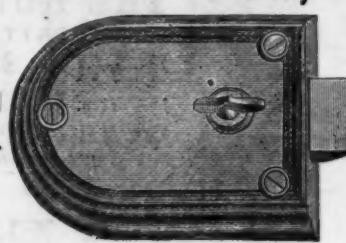
THE AMERICAN LOCK MFG. CO.,

Sole Manufacturers of the

FELTER PATENT  
Locks & Latches,

Comprising

Upright Rim Dead Locks, Horizontal Rim Night Latches, Mortise Night Latches, Drawer, Desk Cupboard, Box, Wardrobe, Tool Chest, and Pad Locks, &amp;c., &amp;c.,



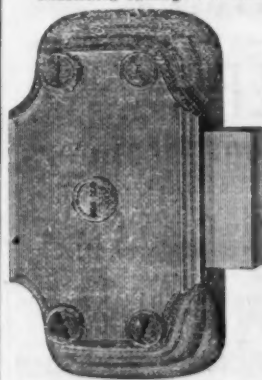
Each Lock is furnished with TWO OR MORE SMALL, FLAT, STERLING METAL KEYS.

The Locks are fitted to the Keys and not the Keys to the Locks, and as no impression of the Lock can be taken, no false (or counterfeit) Keys can be made without the original Key to work from. The variation of one-fiftieth of an inch in any of the tumbler of the Lock from the position in which they are fitted, prevents the working of the Lock.

Each Lock contains forty tumblers, each having five false notches, which bear upon the Key at two different points and are worked without the aid of any springs.

All working parts of the Lock are made of fine brass, securely incased, and all bolts in the Locks are moved by an Eccentric, hence there are no springs to break or wear out. When extra Keys are desired, one of the original Keys must be returned, as we do not duplicate by number.

Illustrated Catalogues furnished upon application.

AGENCIES:  
UNION NUT CO., 99 Chambers Street, New York.  
MACOMBER, BIGELOW & DOWSE,  
146 Oliver Street, Boston.

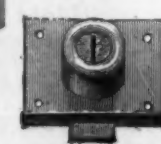
BIDDLE HARDWARE CO., 509 Commerce St., Phila.

EDWARD M. KEITH,  
25 South Charles Street, Baltimore, Md.

And Sold by the

LEADING JOBBERS IN HARDWARE

Throughout the United States and Canada.



FULL SIZE OF KEY.

PHILIP S. BIGLIN,

Successor to W. F. SHATTUCK &amp; CO.,

Manufacturers' Agent for

AMERICAN HARDWARE.

95 Reade &amp; 113 Chambers Sts., New York,

Cox & Tait's Pat. Wrenches.  
Axe Pick, Sledge & Hammer  
Ironing Board, Sippers,  
C. A. Wellman & Co., Gimlets  
and Gimlet Bits.  
Angers and Auger Bits.Holroyd's Stocks & Dies.  
E. C. Maltby's Cresset Nut &  
Britannia Sippers.  
Patent Tap Borers.  
Portland Horse Nails.Eddy's Lamp Black.  
Shattuck's Platform Counter  
Scales.  
Yan's Cow Bells.  
Axes, Picks and Hatchets.

JOHN MAXHEIMER,

Manufacturer of

Japanned &amp; Patent Eureka Bright Metal

BIRD CAGES,

247 and 249

Pearl Street,

NEW YORK.

—FULL SIZE OF—

WIRE CONNECTION

Patented, June 8, 1902;

Aug. 11, 1899; Dec. 23, 1878;

Jan. 20, 1874; Dec. 22, 1874;

April 20, 1875.

OSBORN MFG. CO.  
TRADE MARK  
BLEECKER ST. NEW YORK.

The Original Inventors and Manufacturers of the

OSBORN BRIGHT METAL CAGES.

Also OSBORN &amp; DRAYTON improvements under

twelve different patents. We are continually bringing

out new and beautiful designs to meet the demands of

refinement and taste.

ALVAN DRAYTON General Agent

Champion Centennial  
MATCH SAFE.

Exposing one match at a time.

Plain, \$30 per gross.

Ornamental, \$36 per gross.

Agents wanted in every

country throughout the State.

PRICE EVANS,  
Sole Owner of Patent,  
635 Greenwich St., N. Y.

OVER 35,000 IN USE.



THE BEST FOR PRACTICAL PURPOSES.

SEVEN SIZES HAND MACHINES.

TWO STYLES HORSE MACHINES.

The most complete and perfect Lawn Mowers in the

World.

The sales exceed all other Lawn Mowers combined.

Prices reduced for 1876. Send for descriptive Catalogue.

GRAHAM, EMLEN &amp; PASSMORE,

PATENTERS AND MANUFACTURERS,  
No. 431 Market Street, Philadelphia.

H. CARTER

290 Pearl Street, New York.



Potter's Patent

STEP LADDERS.

Manufacturer of and Dealer in all descriptions of

Moulders' and Plasterers' Tools,

And Dealers in

General Hardware, Glided Copper Weather Vanes,

CARTER'S PATENT CARRIAGE LIFTING JACK, &amp;c.

## Cutlery.

**THE LAMSON & GOODNOW MFG. CO. N.Y.**  
**88 CHAMBERS ST.**  
**AMERICAN TABLE CUTLERY & C.**

**FRIEDMANN & LAUTERJUNG,**  
 MANUFACTURERS OF

Pen and Pocket Cutlery, Solid Steel Scissors, Shears, Razors,  
 Russia Leather Straps, Hones, &c.

Sole Proprietors of the renowned full concave patent

**"ELECTRIC RAZORS,"**

And the celebrated **"ELECTRIC SHEARS."** Nickel Plated

Agents for the **BENGALL RAZORS.**

**AMERICAN TABLE CUTLERY, BUTCHER KNIVES, &c.**

91 Chambers and 73 Reade Sts., N. Y. 423 N. Fifth St., ST. LOUIS, MO.

**TABLE KNIVES AND FORKS OF ALL KINDS,**  
 AND ORIGINALLY EXCLUSIVE MAKERS OF



Also the exclusive makers of the "Patent Ivory" or Celluloid Knife, which is the most durable  
 White Handle Knife known. These handles never get loose. Always call for the "Trade Mark."

**"MERIDEN CUTLERY COMPANY"** on the blade.

Warranted and sold by all dealers in Cutlery, and by the **MERIDEN CUTLERY CO., 49 Chambers St., N. Y.**

**THE MILLER BROTHERS CUTLERY CO.,**

Manufacturers of

**PATENT FINE PEN & POCKET CUTLERY**  
**WEST MERIDEN, CONN.**

The only knives made that are put together in such a manner that there is no strain on the cov-  
 ering or frail part of the knife. We warrant our knives equal in cutting qualities and workmanship to any  
 made, and are acknowledged by English makers as the **Best American Knife.** We also make

**NICKEL & SILVER PLATED POCKET KNIVES**

which will not rust or become discolored when used as a Fruit Knife, and their cutting qualities are equal  
 to any other knife. Orders filled from the factory, and in New York by **Messrs. J. Clark Wilson**  
 & Co., No. 81 Beekman Street (who have a full stock of all patterns always on hand), and also by  
 Messrs. G. B. Walbridge & Co., No. 99 Chambers Street.

**Naugatuck Cutlery Co.,**  
 Manufacturers of FINE

**PEN and POCKET CUTLERY.**

FULLER BROTHERS, Sole Agents, 89 Chambers and 71 Reade Sts., N. Y.

**JOSEPH RYALS, Collinsville, Conn.,**  
 Manufacturer of Patent



**SHEARS & SCISSORS.**

Made by a new process **RECENTLY PATENTED** which enables  
 me to produce goods that in quality, finish and general excellence surpass  
 any. All warranted Solid Cast Steel Blades.

**ROGERS & BRO.,**  
 MANUFACTURERS OF

**FINE ELECTRO-SILVER PLATE**

**Spoons, Forks, Knives & Hollow Ware**  
 IN GREAT VARIETY.

690 Broadway, NEW YORK.

Price List mailed on receipt of Business Card.

Address, Box 320.

**VAN WART, SON & CO.**

Hardware Commission Merchants.  
 EXPORTERS AND IMPORTERS,  
**BIRMINGHAM, - ENGLAND,**

Agents,

**VAN WART & MCCOY,**

184 & 186 Duane Street, N. Y.

George H. Gray & Danforth,

88 India Street, Boston.

F. W. TILTON,

17 Old Levee Street, New Orleans.

At each of these places a complete assortment of sam-  
 ples of Hardware and Fancy Goods will be found, in-  
 cluding all new descriptions. Sole Agents for

**John Himmer & Son's Celebrated**

**Harness and other Needles.**

**W. Clark's Genuine Horse Clippers.**

**Seydel's "Ashantee" Pocket Hammock**

**OSCAR IRVING VAN WART & Co.,**

FORWARDING AGENTS,

2 South John Street, LIVERPOOL.



**WHEEL**  
**BRUSHES**

For  
 Nickel Platers and  
 Silver Smiths.  
**R. M. PHILLIPS,**  
 Manufacturer,  
 117 JOHN STREET, N. Y.

X. L. C. R. X. L. C. R.

**EMANUEL MARX,**

IMPORTER OF

**Table & Pocket Cutlery,**

Solid Steel Shears, Britannia Spoons, Brit-  
 tania Soup Ladles & Toy Castors.

OFFICE & WAREHOUSE, 55 Jersey Street, near  
 Church, New York. Sent for Price List.

**AMERICAN**

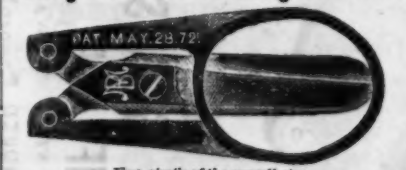
**PEN AND POCKET KNIVES,**

MANUFACTURED BY **PEPPERELL,**

**Aaron Burkinshaw, MASSACHUSETTS**

My Blades are forged from the best Cast Steel, and  
 warranted. To me was awarded the GOLD MEDAL of  
 the Connecticut State Agricultural Society; also a 1st and  
 2nd Diplomas from the Mass. Mechanics' Ass'n Sept. 1875.

**Young's Patent Folding Scissors.**



These Scissors are made of the very best steel, nickel  
 plated, and so constructed that they can be readily  
 folded and carried in the pocket without injury to the  
 garments. A sample pair will be sent by mail, so the  
 trade only, upon receipt of the retail price, namely:  
 For small size, either blunt or pointed.....\$1.00  
 Large size, pointed or half pointed.....\$1.50  
 New York, Feb. 1st, 1876.  
**MARX BROS., Proprietors,**  
 430 Broadway.

## Cutlery.

Office of THE NEW YORK KNIFE CO.,  
 WALKILL RIVER WORKS,  
 WALDEN, ORANGE CO., N. Y., Mar. 17th, 1876.

**NOTICE TO THE TRADE.**

We have this day withdrawn the Agency of our  
**TABLE AND POCKET CUTLERY** from  
 ROWE, BARCOCK & POST, of No. 120 Chambers  
 Street, New York, and placed our goods with THE  
 WIEBUNSCHE & HILGER HARDWARE CO., of Nos.  
 84 and 86 Chambers Street, New York, who will act  
 as our Agents, where a full line of our samples and  
 goods may be seen.  
 We would caution our customers against buying  
 goods stamped "NEW YORK CUTLERY CO." sold  
 as Cutlery manufactured by THE NEW YORK  
 KNIFE CO., Walden, Orange Co., N. Y.

THE NEW YORK KNIFE CO.,

THOS. J. BRADLEY, Pres.

ESTABLISHED 1853.

**NEW YORK KNIFE CO.**

MANUFACTURERS OF SUPERIOR

**Table & Pocket Cutlery,**

WARRANTED TO BE MADE OF THE BEST  
 MATERIAL.

**WALKILL RIVER WORKS,**

Walden, Orange Co., New York.

THOS. J. BRADLEY, President.



**JOSEPH S. FISHER,**

No. 411 Commerce St., PHILADELPHIA

AGENT FOR

**George Wostenholm & Son,**

"Limited,"

Washington Works, SHEFFIELD,

Celebrated I-XL Cutlery, Razors, &c

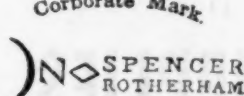
AGENT FOR

**WALTER SPENCER & CO.,**

Steel and File Manufacturers,

Rotherham, ENGLAND.

Corporate Mark



Granted 1777.

**F. W. HARROLD,**

Birmingham and Sheffield,

ENGLAND.

Importer on Commission

OR

**HARDWARE, CUTLERY, GUNS, &c.**

**W. SANDERS, Agent,**

76 Reade Street, N. Y.

CORPORATE MARK,

**Joseph Rodgers & Sons'**

(LIMITED)

**CELEBRATED CUTLERY,**

No. 83 Chambers Street, New York.

**F. & W. CLATWORTHY, Agents.**

The demand for **Joseph Rodgers & Sons'**  
 productions having considerably increased, they  
 have, in order to meet it, greatly extended their  
 Manufacturing Premises and Steam

wer.

To distinguish Articles of **Joseph Rodgers**  
 & Sons' Manufacture, please to see that they bear  
 their Corporate Mark.

**ASLINE WARD,**

101 and 103 Duane Street, N. Y.

REPRESENTING

**GEO. WOSTENHOLM & SON,**

"LIMITED,"

**CUTLERY AND RAZORS,**

Washington Works, Sheffield,

CORPORATE MARK.

**FREDERICK WARD & CO., Sheffield,**

Cutlery and Table Knives.

CORPORATE MARK.

**B4\*ANY**

## New Publications.

**PRACTICAL TREATISE ON CONSTRUCTION OF IRON**  
**BRIDGE BUILDING,** for the use of town committ-  
 ees, together with a short essay upon the applica-  
 tion of the principles of the lever to a ready  
 analysis of the strains upon the more customary  
 forms of beams and trusses. By Alfred P. Bol-  
 ler, A. M., Civil Engineer, member of the Ameri-  
 can Society of Civil Engineers. 144 pages. John  
 Wiley & Son, 15 Astor Place, New York.

The author has not attempted in this work to  
 give an exhaustive treatise upon the subject of  
 bridge building, but rather to put the subject  
 in such a form that any one may comprehend  
 the general principles upon which they are  
 constructed. Too many of our highway bridges  
 have been furnished under the direction of  
 committees or town officers who know nothing  
 of the subject themselves, and whose only possi-  
 ble standard for judging was the amount of  
 money which the bridge was to cost when com-  
 pleted. The work is intended to give committees  
 just such information as they ought to possess  
 to enable them to select a bridge and watch its  
 construction intelligently. It will also be of  
 value to engineers not experts in this  
 branch of the profession, who are called upon  
 to act as inspectors. To give a general idea of  
 its contents we cannot do better than note a few  
 of the subjects as they occur: Factor of safety,  
 loading, iron manufacture, wrought iron, frac-  
 ture of iron, testing iron, standard quality, best  
 specimens, cast iron. Then we have bridge  
 construction taken up, and the different styles  
 of bridges discussed at some length. The de-  
 tails are explained, and the value of different  
 methods of finishing members explained. One  
 or two of the latter chapters are occupied with  
 the mathematical features of the work.

Taken altogether this is one of the most valu-  
 able works of the kind which we have seen. It  
 should be in the hands of all who are in any way  
 interested in the subject.

Van Nostrand's Science Series, No. 22.

**HIGH MASONRY DAMS.** By John B. McMaster, C. E.

D. Van Nostrand, 37 Warren Street, New York.

This is a little treatise upon the profile of  
 masonry dams. The author says of it: "We  
 can hope to add but little that is really new, but  
 shall endeavor, by drawing from many sources,  
 to supply our own deficiency, to diminish the  
 errors of others, and thus obtain results very  
 much more accurate than could be desired if  
 we relied solely upon ourselves." The author  
 seems to have put together in a small compass  
 a good many of the formulas most commonly  
 used in connection with this subject, in such  
 form as to be available for reference.

Van Nostrand's Science Series, No. 23.

**THE FATIGUE OF METALS UNDER REPEATED**

**STRAINS.** With Various Tables of the Results of

Experiments. From the German of Prof. Ludwig

Spangenberg, with a Preface by S. H. Shreve,

A. M., D. Van Nostrand, 37 Warren Street, New

York.

This is a valuable and timely contribution to  
 our literature upon this subject. The experi-  
 ments are of great value, and are of interest to  
 all who wish to study the character of metals  
 when exposed to strains. It is unfortunate  
 that the translator has not given the weights  
 and dimensions in English pounds and inches.  
 Certain other points in the work lead us to re-  
 gret that the translator had not bestowed a lit-  
 tle more time and labor upon his work. These  
 things do not seriously impair the value of the  
 little volume.

**Centennial Notes.**

W. C. ALLISON & CO.,

Philadelphia. This firm has one of the largest  
 exhibits in Machinery Hall, occupying a space  
 38x28. With such heavy material as they use,  
 and such articles as they produce, it is difficult  
 to make a display of much attraction to the  
 general visitor. They have, however, so ar-  
 ranged their exhibits that the display is both ar-  
 tistic and attractive, beside being of a very  
 useful character, and to the trade deeply inter-  
 esting.

The space is surrounded by a railing of iron  
 tubes, and at the rear is found a pyramid of  
 tubing, galvanized and black and steel boiler  
 tubing, in diameter of from 1 1/4 to 10 inches  
 each. Immediately fronting the entrance to the  
 exhibit is placed a very fine picture of the  
 works of the firm at Thirty-second and Walnut  
 streets, which embrace an area of 18 1/4 acres, of  
 which 7 1/4 acres are under cover. A large por-  
 tion of the business of the firm is in car  
 building, and in order to illustrate that depart-  
 ment, they have photographs of the various  
 cars, both complete and in process of building.  
 The photographs are of large size, 38 in num-  
 ber, and beside serving as illustrations of the  
 business, in connection with the picture of the  
 works, make a very handsome appearance.

On two sides of the space they have exhibits  
 of bolts, nuts, rivets, sockets, wood screws,  
 car forgings and heavy forgings for bridges  
 and buildings. These are arranged on pyra-  
 mids 16 feet high, each pyramid being sur-  
 mounted with an American eagle. One of the  
 most striking features in the exhibit is in the  
 arranging and grouping of the various articles  
 so as to form a series of beautiful figures, and  
 the taste shown throughout is certainly deserv-  
 ing of the highest praise.

One of their specialties is a car brake, in-  
 vented and patented by the senior partner of  
 the firm, and also exhibited here. It is hung to  
 the spring plank and not to the bolster (as in  
 ordinary brakes), thus keeping the brake shoes  
 in a permanent position. Another invention by  
 the same party is the patent socket or pipe  
 coupling.

The advantages of the improvement may be  
 enumerated and described as follows:

First. There is a perfect metallic contact  
 throughout between the socket and the tube,  
 every portion of the thread of one fitting the  
 thread of another; hence, a more perfect and  
 secure joint is made than by the old mode of  
 coupling.

Second. No abrupt shoulder, and no incision  
 forming a nucleus for a fracture of the tube,

are presented, the vanishing screw preventing  
 the formation of such an incision.

Third. The socket adds to the strength of the  
 tubes, where the joint occurs; whereas, in the  
 old mode, the socket afforded no protection  
 against the fracture of the tube.

In this connection, it may be observed that  
 the end of the tube may be screwed so far into  
 the socket that the end of the latter will pro-  
 ject beyond the end of the vanishing and taper-  
 ing thread of the screw, and this projecting  
 end of the socket adds to the strength of the  
 joint, which is, in fact, more secure and more  
 proof against the evil effects of tremors and  
 jars than any other part of the tubing.

The use of the tapering and vanishing thread  
 also enables the pipe to be screwed into the  
 socket until it becomes jammed tightly therein,  
 which is another advantage possessed over the  
 ordinary method of coupling, the abrupt should-  
 er in the latter preventing the joint from being  
 further tightened after the pipe has been  
 screwed into the socket to that point.

For this reason, Mr. Allison's joint is invari-  
 ably a tight one, no matter how often it may  
 be taken apart and screwed up again, the ordi-  
 nary joint on the contrary wearing looser each  
 time it is unscrewed.

The best proof of the advantages of this  
 joint, however, is the result of the tests to  
 which it has been subjected.

A tube with the improved socket separated  
 outside the latter when subjected to a tensile  
 strain of 65,000 pounds to the square inch,  
 while a similar tube, with a standard socket,  
 yielded, under a strain of 37,000 pounds per  
 square inch, the threads of the socket being  
 stripped.

The threads of both socket and tubes remain  
 perfect, no matter how often the tubes may be  
 screwed and unscrewed. This was determined  
 by the following test:

A tube was screwed as tight as possible into  
 the socket, and then unscrewed, and after this  
 operation was repeated 160 times, it was found  
 that the threads remained perfect. The same  
 severe test was applied to the standard socket,  
 and on screwing the tube tight for the tenth  
 time the socket burst.

To test the transverse strain, two pieces of  
 tubing were connected together with a patent  
 socket, and a weight of 4000 pounds was sus-  
 pended from the latter; the tube was, of  
 course, bent, but after the weight was removed  
 the tube resisted an internal hydraulic pressure  
 of 2000 pounds per square inch; whereas, on  
 two tubes, with the standard socket, being sub-  
 jected to a weight of 3300 pounds, under like  
 circumstances, they broke off close to the  
 socket—that is, at the point we have referred  
 to above, where the nucleus of a fracture must  
 always exist when the ordinary socket is used.

These results of careful tests have been de-  
 rived from the best authority, and they are so  
 satisfactory that the invention has attracted the  
 attention of bridge builders, by whom the  
 tubes coupled, in accordance with Mr. Allison's  
 invention, have been extensively used in place  
 of the usual solid tie bolts.

Mr. Allison's pipe joint has been most highly  
 commended, especially by those who have used  
 it in the oil regions, where the great depth to  
 which these pipes are carried renders it impera-  
 tively necessary that the joint shall be sound  
 and air-tight.

There is also another invention by Mr. Ira C.  
 Hoskins, an employee of the exhibitors, which  
 is said to be very useful and very ingenious. It  
 is used for gauging sheet metal, and we under-  
 stand its special merits are generally admitted  
 and appreciated.

Another prominent feature of the exhibit is  
 the Doty revolving scraper, for which W. C.  
 Allison & Co. are the Philadelphia agents. This  
 scraper is so well known, and its merits so gen-  
 erally conceded, that no detailed description is  
 necessary. We understand that upward of  
 25,000 of these scrapers are in use in the United  
 States and Canada, and that the demand is  
 constantly increasing.

**The Nail Interest at Wheeling.**

A correspondent writing to us from Wheel-  
 ing, W. Va., under date of June 24th, says:

We have been watching with a good deal of  
 pleasure the course business has taken since  
 the organization of the Western Nail Associa-  
 tion; and to the credit of the members and  
 friends of that organization be it said that they  
 "have kept the faith," and are now reaping their  
 reward in the shape of better prices and fair  
 orders, although some of the mills have consid-  
 erable stock. For that reason there is a strong  
 disposition manifested to shut down for a  
 month or six weeks. They are determined to  
 reduce the production of nails to the wants of  
 the trade, and think that it will have a tendency  
 to strengthen prices. There is a growing dis-  
 position among the boilers operating here to  
 demand of the mills the usual advance  
 over Pittsburgh price of bolting, viz., 25 cents.  
 The injustice of this demand is manifest from  
 the fact that, some time ago, the boilers gave  
 the different mills a written notice that they  
 would not be governed in any way by the price  
 paid at Pittsburgh, and that they intended to  
 cut loose from the time honored custom. The  
 action of the boilers at that time was considered  
 quite liberal, and they continued to be paid at  
 the \$5 rate when boilers in Pittsburgh were  
 only getting \$4.50 to \$4.75 per ton. It is not  
 thought probable that any serious consequences  
 will result from this demand, and hopes are en-  
 tertained that it will not be practicable at the  
 time, as all the mills are pretty well supplied  
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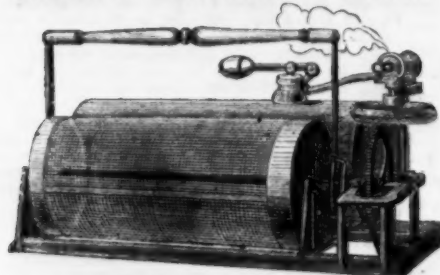
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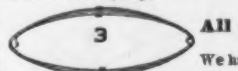
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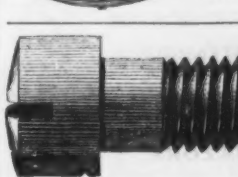
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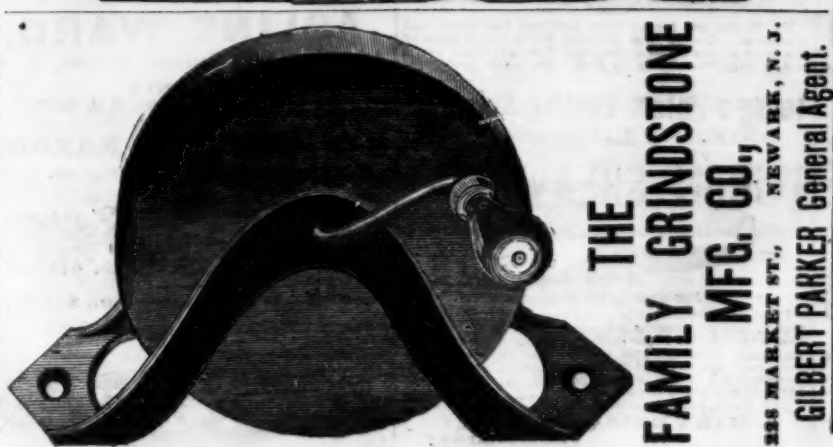
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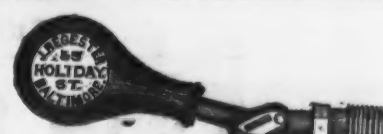
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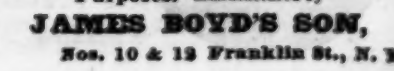
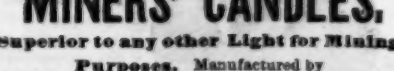
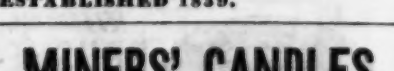
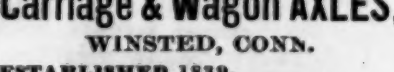
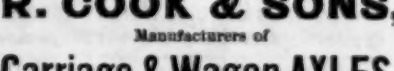
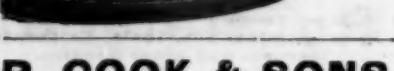
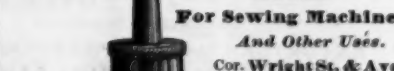
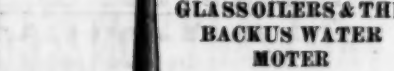
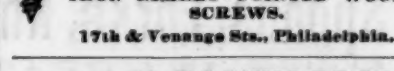
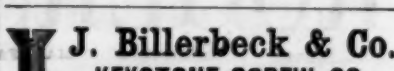
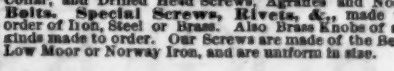
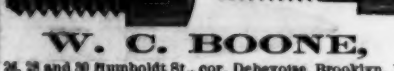
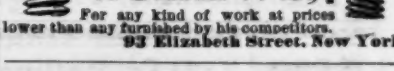
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City subscribers will confer a favor upon the Publisher by reporting at this office any delinquency on the part of carriers in delivering the *Iron Age*; also, the loss of any papers for which the carriers are responsible. Our carriers are instructed to deliver papers only to persons authorized to receive them, and not to throw them in hall ways or upon stairs; and it is our desire and intention to enforce this rule in every instance.

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### The "No Compromise" Resolution of the Stove Manufacturers.

A correspondent in the stove trade writes us as follows:

MOUNT HOLLY, N. J., June 19, 1876.  
To the Editor of *The Iron Age*—DEAR SIR: In your issue of the 22d inst. the doings and sayings of the National Association of Stove Founders are very fully reported, and much stress is laid upon, and some comments favorable to, the resolution so unanimously adopted, that hereafter "no compromise" shall be in their dealings with their unfortunate debtors, but that, like Shylock, the pound of flesh shall be insisted upon, and the only subterfuge that will pass them back into the fold shall be 100 cents to the dollar. Now permit an humble retail dealer to suggest that the greatest part of total failures in the stove trade throughout the country is due to the class of salesmen sent out by the manufacturers. They are for the most part inexperienced young men, with no other ambition than to sell large bills, no matter who the customer may be, or what his business responsibility is, nor whether he will enter into a ruinous business competition with an old established and reliable firm. If he will only buy, the order is quickly taken and sent forward for "just a sample, you know," say two or three of each size; one or two "Retrospective Light" Gas Burners and just a few "Double Back Action Combination Ranges," with hot water reservoir and warming closet attachments.

The irresponsible dealer is now on an equal footing with his well-to-do neighbor, whose stock must be paid for, or the inevitable draft comes along, only to force payment or dishonor or paper. The stock must now be sold, and it is offered at such prices as preclude the possibility of competition by the old firm. The goods are soon all gone, but there is no money left to pay with, for the expense account has devoured the lion's share. The manufacturer has lost his goods, the well-to-do dealer has lost his customers, and no one seems to have benefited by the original order save the genitric young man whose salary has been raised because he is so successful in placing orders. Let the wholesale dealers send out reliable

salesmen who are posted in the trade, and instruct them to take orders only from reliable parties, or those who can give good security. Then, and not until then, will the honest retail dealer be enabled to sell his goods at a fair profit, and be prepared to pay 100 cents to the dollar and no compromise.

Respectfully,  
There is a ring of sound good sense in what our correspondent says, which should commend itself to the consideration of the stove manufacturers. Regarding the "no compromise" resolution from the standpoint of an honest and solvent tradesman, who naturally feels a sympathy with and for his less fortunate neighbors, it seems to him that the manufacturers have adopted rather a hard policy, especially as their salesmen often persuade tradesmen against their judgment to take goods they do not really want, and which, having them, they cannot dispose of. In their anxiety to sell, the travelers often scan credits very carelessly, and not infrequently misrepresent, or report upon very slight and unsatisfactory testimony that those to whom they are selling can be safely given the usual four months' time. Easy credits always tempt young and inexperienced tradesmen to launch out beyond the limits of safety in the hope of making a fortunate strike, and when this policy is encouraged by travelers, whose only thought is to sell as many stoves as possible, it may seem at first glance a little hard to hold those who cannot pay their notes at maturity to so strict an account as is promised in the "no compromise" resolution of the manufacturers. We understand this to be the view taken of their action by our correspondent, who probably reflects the sentiments of a great many dealers.

It will be obvious, however, upon closer examination, that the manufacturers have been compelled to adopt this "no compromise" policy in self-defense. During the past few years they have suffered heavily at the hands of dealers who have failed for profit. It has only been necessary to threaten to go into bankruptcy to induce creditors to accede to very easy terms, and there are thousands of tradesmen throughout the country to-day who have purchased the goods they are selling at from 15 to 60 per cent. of the prices they agreed to pay for them. During, and for about a year after the panic, manufacturers dealt very leniently with delinquent debtors, and there can be no question that many tradesmen took unfair advantage of this disposition to effect dishonest settlements. The instances of fraud and duplicity mentioned by stove manufacturers in the discussion of the resolution to which our correspondent refers, were well calculated to excite surprise, and the object of the "no compromise" policy is simply to protect the manufacturer against a class of irresponsible and dishonest dealers who have abused their confidence and defrauded them out of large sums which would have been paid had the debtors been given the choice between payment or bankruptcy. This is a measure of protection which the manufacturer not only owes to himself but to his customers who buy on four months' credit and pay 100 cents on the dollar, and who cannot compete with a neighbor who gets his goods at half price and saves from his dishonest settlement enough capital to enable him to replenish for cash and get the benefit of the 5 per cent. discount.

Without calling in question the sincerity of the "no compromise" resolution, we can say with confidence that the honest, unfortunate debtor, whose inability to meet his notes arises from causes beyond his control, has no more reason now than before to feel that he has hard creditors to deal with. It was understood and specified that the resolution did not apply to debtors who, from other causes than bad management or over-trading, are unable to pay in full. "Where shall we draw the line at which leniency shall cease?" asked one manufacturer. "That," answered another, "must be left to the good sense of the manufacturer to determine," and the answer expressed the sentiment of the meeting. All the resolution means is that there shall hereafter be no compromise with men who are able to pay, or with those whose inability results from causes against which foresight and good management could have guarded. It is only by the weeding out of those who cannot do business successfully, that success is possible for any one in business. The dealer who cannot meet his notes must "step down and out," and unless he can show good reason for his inability to pay his debts, he has no right to expect anything less than a demand for the surrender of the assets upon which his credit was based. The stove manufacturers "mean business," and by enforcing the rule they have adopted they will do much to raise the standard of honesty in the trade, and make failures less frequent than they have been of late. As our correspondent suggests, however, the manufacturers would do well to scan credits closely, and not to be over anxious to sell. A careful and conserva-

tive policy pays better in the long run than a large trade and a proportionate accumulation of bad debts and losses.

### Dr. Wurtz's Great Chemical Discovery.

Chemistry is most truly an inductive science. Ever since the day when Priestly discovered oxygen, a century ago, its disciples have been carefully collecting facts from which to deduce laws and build a general theory of chemistry. One by one these laws have become apparent, and great minds have formulated them. One of the first and most important was that of combination by weight. Long after that the law of combination by volume appeared, and made quite a revolution in our formulas, a reform not yet introduced into all our schools, still less into practical life.

Chemistry has well been defined as molecular physics, and the application of physical laws to the molecules is becoming more and more general. From a study of the specific heat of gases, Ampere deduced the important law that "equal volumes of all gases contain the same number of molecules." This gave us some idea of the size of molecules in a gaseous state.

In 1855 Hermann Kopp took up the study of the size of the molecules in liquids and solids. Starting with the hypothesis that the volume of a molecule could be represented by the quotient resulting from dividing its atomic weight by its specific gravity, referred to water, he determined the molecular volume of a great variety of substances. His results will be found in Watts' Dictionary of Chemistry, under the head of "Atomic Volumes."

Quite recently Dr. Henry Wurtz, of Hoboken, took up the study of these molecular volumes, and found that if the specific gravity be taken at the point of incipient ice fusion instead of the boiling points, many of them would become, on being multiplied by 1000, perfect cubes of whole numbers. Let us take, for example, water, which has, in a fluid state, the density 1; and its equivalent, 18 divided by 1, equals 18, which is not a perfect cube. The density of ice is about 0.9145, which divided into 18 and multiplied by 1000, gives us 19,683=27<sup>3</sup>.

As oxygen is never seen in a solid or liquid state, it is necessary to calculate its volume from some liquid in which it occurs. Kopp took water at 100° C., and found its molecular volume to be 18+0.9579=1818, and subtracting the volume of 3 molecules of hydrogen at 5.5 each, he found for oxygen in water the molecular volume 7.8.

Dr. Wurtz obtained the molecular volume of oxygen by comparing the volume of water with that of peroxide of hydrogen, and ascribing the difference to oxygen. In this way he obtained for oxygen the molecular volume 5184=3×12<sup>3</sup>, and according to his calculations, this never changes, while the atomic volumes of every other element, but especially hydrogen, do change. But the atomic volumes, both of elements and compound radicals, always change from one perfect cube to another. Hence he deduces his first law, which may be stated as follows: "The volumes of all single chemical molecules, whether of elements or of radicals, except oxygen, are expressed by quantities having the relation of even cubes of a series of whole numbers, that of ice being 27."

If this be true, and Dr. Wurtz brings a long array of figures to sustain it, this simple test for compound radicals will settle the question of writing most of our rational formulas in organic chemistry. Perhaps we should mention that Dr. Wurtz discards, or rather upsets, the whole theory of types, and throws out all of our alcoholic radicals, as shown by his alcohol formulas:

Methyl Alcohol.....H<sub>2</sub>O, H<sub>2</sub>C  
Ethyl ".....H<sub>2</sub>O, 2H<sub>2</sub>C  
Propyl ".....H<sub>2</sub>O, 3H<sub>2</sub>C  
Butyl ".....H<sub>2</sub>O, 4H<sub>2</sub>C

He is obliged to double, or quintuple, many formulas in inorganic chemistry; thus, H<sub>2</sub>, Cl<sub>2</sub> for HCl; H<sub>2</sub>, O<sub>2</sub> for H<sub>2</sub>O; H<sub>2</sub>, O<sub>2</sub> for H<sub>2</sub>O<sub>2</sub>; As<sub>2</sub>, Cl<sub>2</sub> for AsCl<sub>3</sub>; Na<sub>2</sub>, Cl<sub>2</sub> for NaCl. Thus in hydrochloric acid the molecular volume is 28,516, and subtracting the known volume of chlorine 24=13,824, leaves hydrogen 14,692. As this corresponds to no perfect cube, he supposes there are two molecules of hydrogen present, one having the volume 24=13,824 the other 23=15,635. In chloride of potassium the metal falls between 28<sup>3</sup> and 29<sup>3</sup>, so he again assumes two molecules, one of each size. Inasmuch as similar solids are to each other as their cubes, he thinks the above cube roots may represent the diameters of molecules, and thus designates them.

His second law, which he calls *Engymetry*, states that the molecules which combine to form a new substance tend to assume very nearly the same size, hence

we have in argentic chloride, two of silver, one having the diameter 23, and the other 28, while the chlorine is 24, making the series 22, 23, 24.

His third law, which he calls *Oratesis*, states that this tendency to vary in diameter increases with the basicity or electropositive nature of the element, so that while oxygen varies the least, or not at all, hydrogen and the metals vary most.

We cannot, of course, venture any judgment of our own on the merits and value of Dr. Wurtz's theory, but it has met with a most favorable reception by chemists, and is by them regarded as an important contribution to our knowledge of the theory of the constitution of matter. That a discovery so great should have been made by an American chemist and laid before the world at this time, is peculiarly gratifying. The progress of scientific investigation and research in this country is a matter of surprise to intelligent foreign visitors, but such work as that by Dr. Wurtz will place our chemists alongside the greatest names of the Old World, even in the estimation of Europeans.

### The Situation of Copper.

The American copper market has weakened considerably of late, notwithstanding the unusually large shipments of that metal to Europe, and the still larger quantities engaged to follow in the same direction during the remainder of the year. The fact is that activity in brass manufacture in the United States has not come up to expectations, and there is no prospect of a revival. Manufacturers of copper and brass are known to have very light stocks, however, and any sudden resolution on their part to replenish would find the market in a position favorable to holders, the new copper arriving being mostly sold ahead.

In Europe, on the contrary, up to quite recently, the tendency has been rather an upward one, for various reasons, which we shall endeavor to explain upon an examination of the latest statistics at hand. Leaving out the 1475 tons afloat for Europe from Australia, advised by mail, and the 2500 tons afloat and chartered from Chili, advised by cable, we find the following:

VISIBLE SUPPLY OF COPPER IN EUROPE.			
	1876.	1875.	1874.
	May 1.	May 1.	May 1.
Tons.	Tons.	Tons.	Tons.
Stock at Liverpool and Swansea, Chili bars.....	9,648	12,965	20,358
Stock at London, English and Australian.....	7,304	7,628	7,619
Stock at Havre, Chili bars, &c.....	7,385	2,466	2,776
Chili chartered and afloat, by mail.....	21,335	23,126	30,647
	10,819	7,037	6,330
	32,154	30,163	36,997
Price of Chili bars.....	£79. 10/	£83.	£74.
Import, 4 months.....	19,667	23,697	23,378
Deliveries, 4 months.....	15,779	21,389	20,570

From the foregoing it will be seen that the actual stock of Chili bars has run unusually low at Liverpool and Swansea, but the deficiency is compensated by the excess afloat.

Both the stock and the amount on the way was, however, held by strong parties, and as the smelters had run rather short in their available supply of West Coast and other copper, the London importers up to the present month of June have been enabled to uphold rather stiff figures. The advance thus gradually brought about was further sustained by the general statistical position of copper. The import was some 4000 tons less, while the deliveries have fallen behind about as much. So far as statistics can show, there was, consequently, nothing of an exciting nature at hand, the demand for manufactured copper being quite slack. It was understood, however, that for war purposes a great deal of copper has been absorbed this year, and a large part of the amount afloat from the West Coast goes direct into the hands of the French military authorities.

Considering the dullness in the European metal trade, it must be confessed that copper has done remarkably well, which was mainly due to this uninterrupted government demand. When the year opened, it was apprehended that any weakness that might be inherent in the copper situation would be found and developed in Europe, and that the metal was safe enough here.

During the current month of June, Chili bars, as well as best selected, have been gradually yielding some £2 or £3 in the London market, in anticipation of the Wallaroo auction sale, but the same thing having happened two months ago, when a rebound soon followed, the market on the other side may soon right again.

Our own market has shown increased weakness lately from dullness in trade, and it remains to be seen whether some combination during the next few months will be resorted to, with a view to sustaining a market at present wholly unsupported by a domestic demand.

### The American Institute of Mining Engineers.

We can honestly congratulate the American Institute of Mining Engineers upon the events of the past two weeks in which it has taken part. It has had a memorable meeting, which has done much to give it a position of equality with the greatest scientific societies of the world. The large attendance of members, the number and eminence of the invited guests, the interest and permanent value of the papers read before it, the pleasant character of its conversational, and last, though by no means least, the election of Hon. Abraham S. Hewitt to its presidency for the ensuing year, are all matters for honest and hearty congratulation. In the choice of its presiding officers the Institute has been especially fortunate. No one better fitted for the work of organization and for the recruiting of members could have been found than its first president, the genial and accomplished Prof. R. W. Raymond; none could have given it more influence among metallurgists and mechanical engineers than Mr. A. L. Holley; and no man in the country is more worthy of the position as head of our leading scientific metallurgical society than Mr. Hewitt, whose ripe wisdom, large experience, high position as iron-master and practical statesman, and fine oratorical powers, combine to fit him in a peculiar degree for the office to which he has been chosen. For all these things, as well as its rapid growth, present strength and the excellent character of its membership, we heartily congratulate the Institute.

We also congratulate the members and our readers upon the very valuable essay of Mr. Isaac Lowthian Bell, M. P., read before the Institute on Tuesday last, and published in full on another page of this issue. Mr. Bell's paper is a valuable contribution to the literature of the blast furnace, to which he has made so many valuable additions. We do not need to invite for Mr. Bell's paper a careful perusal; that it is certain to have. Finally, we congratulate our readers upon finding Mr. Bell's paper in *The Iron Age*, in advance of its publication elsewhere.

The National Board of Trade, now in session in this city, is a body of much importance, as representing in many respects the great productive and distributive industries of the country. It has the power at this time to exercise an important influence for good in shaping and directing public opinion on many subjects of national interest upon which Congress seems to be hopelessly at sea. That it will fully improve this opportunity is, we think, doubtful. Judging from the results of previous sessions, we fear that a very large part of the session will be taken up in profitless talk, that the resolutions will be too numerous and diffuse, and that by attempting too much they will end by accomplishing nothing. A few questions of national interest, such as the bankrupt law, the regulation by Congress of commercial intercourse between States, and the currency, are large enough to occupy all the time any representative body of merchants can devote to making speeches, and listening to them. The preparation of a long programme, providing for the consideration of everything "on the earth beneath, and in the waters under the earth," we regard as a mistake. No board in session for less than three or four months, could possibly do justice to such a programme as has been prepared for the National Board of Trade, and we shall not be surprised if its deliberations fail to attract more than passing notice from the people, and still less from Congress. Nearly all conventions make the same mistake, and for this reason very few of them have had appreciable influence in shaping public opinion.

**The Arrowaic Iron Mines.**—The Boston Journal of Commerce says: These mines are situated in Arrowaic, Me., directly opposite the city of Bath. The property consists of two mines, called respectively the Stinson and McKenney mines. In a geological survey of the mines, a few years since, Dr. A. A. Hayes says of the ore: "The pure ore is the magnetic oxide of iron, and connected with garnets, manganese, rock and hornblende, with black mica—minerals usually found with the softer magnetic iron ores. Much of the iron ore found at the pit mouth contains twenty-nine per cent. of metallic iron in the ore, and eleven to thirteen per cent. as yield in the blast furnace. This, it should be remembered, is the quality of ore in the bounding and covering rocks. Every fact in connection shows that richer ore will constitute the true lode." Dr. Hayes says: "One hundred parts consist of metallic iron, 55.21; oxygen with it, 10.47; peroxide manganese, 9.60; garnet silica and alumina, 58.72. This is deemed the covering of rich ore, as the minerals are the same as those associated with the excellent Franconia ore. In the blast furnace the garnets serve as a flux, rendering the addition of any further flux, unnecessary. Samples of the ore taken by myself from the openings in both lots occurred with the above results, some yielding as high as forty per cent. of iron, the natural flux, with the ore melting as fluid, as glass would."



### The Utilization of Anthracite Slack by Wootten's System.

At the meeting of the American Institute of Mining Engineers, on Tuesday, June 20th, in Philadelphia, Mr. F. B. Gowen, president of the Philadelphia and Reading Railroad, made some interesting remarks on the subject of the utilization of anthracite slack, which did not reach us in time for insertion in our last issue. We give below an abstract of Mr. Gowen's remarks:

It is well known that the wants of the coal market require that anthracite be broken into different sizes. The result is a large production of fine waste or culm. This gathers in large piles around the mouth of pits. In the district with which I am connected, the culm already accumulated amounts to probably 40,000,000 tons. This waste, notwithstanding some admixture of slate, contains as much carbon as most merchantable coal, and some times more. Several attempts have been made to introduce into this country the Belgium system, which requires artificial mixture and pressure. But the cost of this process, which is about \$1 per ton, has precluded its use, except for domestic purposes. The attention of our companies was called some months since to a process for utilizing this culm that demanded neither mixture nor pressure. This process, the invention of Mr. Wootten, superintendent of the Reading Railroad, has already been used successfully in stationary and locomotive engines, and he is now preparing to make it successful on steamships.

As stated, the process requires neither mixture nor pressure. The culm is shoveled into the fire and burned by the aid of a blast. In stationary engines the ash pit is entirely closed, except a small hole in the bottom sufficient to admit the pipe conveying the blast. The grate, instead of being of bars, as usual, is of perforated sheet iron. The blast is created by a small jet of steam, which is admitted through a pipe into another pipe about 20 times its diameter and shaped like the frustum of two cones, apex to apex. The vacuum created by the steam escaping into this pipe causes an enormous draft of air. The pipe leading to the orifice is closed by a valve, held in place by a spring in such a way that the pressure of steam closes the valve, and so regulates the supply. The strength of the spring is regulated to a certain steam pressure, say 100 lbs. When the pressure has reached this point the supply of steam to the blast is shut off and the fire is less fierce. On the reduction of the pressure the spring relaxes, and the blast acts again. There is also a valve that covers the mouth of the orifice leading into the fire box, which also works automatically closing the orifice when the blast is not working, and so preventing a waste of either volume or pressure of blast. Generally two or three blasts are used under the fire box of an engine.

Its trial on a locomotive proved an equal success. The fire box was arranged as above, but it is evident that if the ordinary exhaust of the locomotive was used for the blast, it would be so strong as to carry the fuel up and out of the smoke stack, as well as being too irregular. The use of the exhaust is practically abandoned, and a blast is produced under the ash pan by a jet, in a way that will be explained. In order to utilize the heat of the waste steam it is taken through a series of pipes which act as a condenser of a steam engine. The water from the tender passes through or around these pipes, and the water is heated. About one-third of the steam is condensed. The balance passes out by a pipe up to the top of the stack, but finding no escape, it passes by a 6 inch pipe down and through an annular ring, and back under the ash-pan, where it is used as a blast in the manner before stated. The next experiment will be made on steamers.

Mr. Gowen suggested that experiments be made with this blast and slack in the smelting, puddling and heating of iron. In regard to its economic results, Mr. Gowen stated that one pound of culm from ordinary coal, and of the ordinary run of waste, evaporated 8½ pounds of water—within about a pound of the result obtained from the same amount of best coal. Culm taken from a bank at the mouth of a pit that had been idle for 40 years, evaporated 6½ pounds of water for one pound of the fuel. The applications of this are for engineers, but it seems to me that this great amount of fuel, now a waste, within 90 miles of a seaport town, and worth not over 10 to 20 cents a ton, is worthy of attention.

### The Formation of Anthracite Coal.

We find the following in the Shenandoah Herald:

We have before us now on our table a specimen which is one-half anthracite coal and the other half a solidified sediment that four years ago was all soft sediment. For over four years there has been in use in the Indian Ridge shaft of the Philadelphia Coal and Iron Company, this district, a wooden pipe, about six inches in diameter, made of inch boards nailed together, which served to carry water from one of the rings in the shaft to the lower level. The rings are boxes around the sides of the shafts which catch the water coming out of the rock, slate, or coal, and are put in to prevent the water from falling down and making a regular shower bath of the shaft. At the risk in question a large spring in the slate, about thirty feet below the primrose vein, had been struck, the water from which is apparently as pure as crystal.

Some four months since it was found that this wooden pipe had become so clogged with the reddish brown sediment that is deposited by all mine water, that the open space in it was not more than two inches in diameter, and not large enough to carry off the water from the

ring. Consequently a new pipe was put in, and the old one, nearly closed with the sediment adhering to its sides, was left standing. The water was then turned into the new pipe and cut off from the old one, which is some fifty feet or over in length. After remaining in the shaft without any water passing through it for over four months, the greater part of this old pipe was taken out, and when broken open the wonderful phenomenon presented itself that the sediment was gradually changing into what appeared to be anthracite coal. About a half inch of the inside of the sediment lining the pipe had changed into coal, and the remainder was also gradually changing, the only portions of the sediment remaining quite soft, being that part deposited first and next the sides of the pipe. A cross section of the pipe now shows, commencing at the center, first a circle of coal of about half an inch in diameter surrounding the two-inch opening remaining in the pipe, then a circle of sediment partly turned into coal, and then the sediment in its natural state and the sides of the pipe. The surface of sediment which was exposed to the action of the atmosphere has changed first, and the influence or chemical combination which had changed its nature were gradually operating on the rest of the sediment. The process of formation is plainly seen in the sediment next that already turned into coal.

Samples of coal taken from the pipe have been tried on the blacksmith fire at the colliery, and it makes an exceedingly hot fire, but being of a softer nature than the natural anthracite, it clinkers badly. Fortunately there are any quantity of samples of this wonderful formation, and those who are unwilling to believe without themselves seeing and touching, can be accommodated. There is no Keely motor business about this discovery. A section of the pipe about 16 feet long has been left standing in the shaft, to see what results will follow in the next six months or year. Samples have also been sent to Gen. Pleasants, at Pottsville, for examination, and we suppose the public will soon have the opinion of gentlemen qualified to judge on this surprising formation; but if anthracite coal will form from sediment deposited by mine water when exposed to the action of the atmosphere under certain conditions for a period as short as four months, what becomes of all the pet theories of the geologists and mining engineers on the subject? How about the great heat, the millions of years of time, and tremendous pressure which, according to the various theories of the heretofore accepted authorities, were necessary to account for our deposits of the finest and best fuel yet found?

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**ATTENTION** is invited to the fact that Goods, were entered according to Act of Congress in the year 1876, in the U. S. Patent Office. **IN ADDITION** a full line of *Extension Lip*, Car, Machine, Dowel and Rail Bits, also of Boring Machine, Carpenters' and Millwrights' Augers. All my goods are solid **CAST STEEL**, and perfectly made by means of my Patent Machinery.

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M. McCLERNAN,  
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New York, Jan. 20, 1876.

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**WANTED.**—A first-class business man familiar with machinery and manufacturing, capable of handling large bodies of men, desires a responsible position. References satisfactory. Address, **IRON AND STEEL,**  
Care of P. O. Box 813, Bridgeport, Conn.

### DROP FORGINGS.

The TRENTON VISE & TOOL WORKS, Trenton, N. J., having increased their facilities, are now able to do all kinds of

**Iron and Steel Drop Forgings**  
in quantities to order at reasonable rates.  
**HERMANN BOKER & CO., Proprietors,**  
101 & 103 Duane St., N. Y.

### S. B. LOWE,

Chattanooga, Tenn.  
Dealer in **METALS AND ORES.** Special rates of freight to all principal points in the United States and Canada.

### TO LET,

**A Light, Handsome Office.**

Possession Immediately.

**HERMANN BOKER & CO.,**  
101 Duane Street, N. Y.

### MANUFACTURERS

desirous of introducing their goods to the British and Continental Markets, are advised to insert advertisements in the newspaper "IRON," published every Saturday, at 99 Cannon Street, London, E. C.  
Scale: First 3 lines, 3/; every additional line, 10d. Price, 6d. per Copy, or 30/ per annum, inclusive of postage to the United States.

## Steel Castings.

Solid and Homogeneous. Guaranteed tensile strength, 25 tons to square inch. An invaluable substitute for expensive forgings, or for Cast Iron requiring great strength. Send for circular and price list to  
**CHESTER STEEL CASTINGS CO.,**  
Eccledda St., Philadelphia, Pa.

### Wanted—A Partner,

In a foundry and machine business, already well established. Locality splendid and healthy. A practical man with means is wanted to join a practical man who is already well established.  
Address **CAR WHEEL FOUNDRY,**  
P. O. Box 134, Selma, Alabama.

### Briesen's Patent Agency

**FOR SECURING INVENTIONS, TRADE MARKS, &c., IN AMERICA AND EUROPE.**  
No. 258 Broadway, New York.  
**A. V. BRIESEN.**

**AFTER SEVERAL YEARS OF SUCCESSFUL** experience in the construction of

**New and Experimental Machinery,**  
we desire to invite the attention of manufacturers, and others wanting that class of work, to our facilities at Peekskill, N. Y., near the Hudson River Railroad depot, 1 1/2 miles from N. Y. City.  
**ANDERSON BROTHERS.**

### For Sale, &c.

**HARDWARE BUSINESS**  
For Sale.  
In the city of Norwich, Conn., an old stand facing two streets. Rents low. Good help and doing a prosperous business. Large back country. The best of reasons given for selling. Address,  
**FULLER & PARISH, Norwich, Conn.**

### FOR SALE.

An 1/4 inch mill train for making Merchant, Band and Hoop Iron. Will be sold cheap.  
Apply to **W. W. JONES,**  
Near the Lehigh Valley Railroad Depot,  
Allentown, Pa.

### For Sale.

#### Magnetic Iron Ore For Sale.

1000 tons; contains about 60 per cent. iron; is suitable for making Bessemer steel; makes a fibrous iron; mill clinder may be worked with it to advantage. Delivery at any point on Lakes Ontario or Erie. Apply **J. M. MACHAR,**  
Kingston, Ontario, Canada.  
See specimens from Machar Mine at Centennial.

### For Sale Low.

#### Wire Straightener and Cutter.

This machine is nearly new, having been used but a few times. Connected with it is a machine for making hair pins. The whole will be sold for less than half its cost. Apply to or address **Watson & Kelso,**  
46 & 48 N. Front St., Philadelphia.

### FOR SALE, at Taunton, Mass.

The Steam Engine Works known as the Foundry and Machine Co., consisting of all the Real Estate, Machinery, Tools and Patterns necessary for building Corliss Steam Engines, from 10 inch to 34 inch cylinder; also a full stock of Tools and Machinery for general job work. This property will be sold extremely low, either for the Machinery, Tools and Patterns to be removed, or the entire property. The city of Taunton offers superior advantages as a location for any kind of machine business, having a navigable river for receiving coal and iron. Two lines of railroad connected by steamers between New York and Boston; superior Western connection by railroad, and a large and intelligent manufacturing population. For further particulars or catalogue of machinery address

**GEORGE A. FIELD,**  
Taunton, Mass.

Or **J. M. LEONARD, Somerset, Mass.**

### Screw Factory For Sale.

By order of the Bondholders of the International Screw Nail Company, of New York City, there will be sold at Public Auction, Thursday, July 27th, 1876, at 10:30 o'clock, a. m., on the premises recently occupied by the said company, located in the so-called Bay State Village, in the town of Northampton, Mass., the following property to wit: All that tract of land containing about twelve acres, formerly owned and occupied by the said International Screw Nail Company, together with the buildings thereon, consisting of a brick mill 150x40 ft., three stories high and basement, and six dwelling houses; water privilege of about 60 horse-power, steam boiler and piping for heating the mill, and also the full equipment appertaining to said screw factory for the production of 1500 gross of screws per day, viz: Headers, Shavers and Nickers, Threaders, Patterns, Shafting, Belting, Machine Tools, Office Furniture, Fixtures, Patent Rights, &c., &c.  
For catalogues, apply to

**W. T. CLEMENT, Esq.,**  
Northampton, Mass.

### Hardware Store For Sale.

A Hardware Store near Boston. Satisfactory reasons given for selling. For particulars address **HARDWARE, P. O. Box No. 995, Boston, Mass.**

### PATENT FOR SALE.

The Swiss Industrial Co., of Neuhausen, Switzerland, have invented an apparatus for heating and ventilating R.R. Passenger Cars, and offer their patent, dated May 30, 1876, For Sale.

Apply to **Mr. A. W. MANNEL,**  
88 Prince Street, N. Y.

### FOR SALE.

**TESTING MACHINE,** built by the Son & Boston Iron Co., arranged for tensile and compressive strains, capacity 150 tons.

**MILLING MACHINE,** built by Brainerd Milling Machine Co., cutters averaging 28 inches diameter, and spindle set at right angles, which insures accurate work.

**IRON ROOF,** that covers New England Iron Co.'s Mill, 8 acres, 80 feet span, posts 15 feet high, building now 80 feet wide by 90 feet long.

**ROLLING TABLE,** for straightening iron.

**PURDIE TRAIN,** for Bullets and 3, 4 and 6 inch Bore.

**FIVE DRILLS,**  
**CORRUGATING MACHINE,** Complete.  
**CORRUGATED SHEET IRON** and barbed Nails.

**SMALL UPRIGHT ENGINE,** 15 H. P., inch cylinder.

**PUMPS, Etc.**  
Apply to **WM. E. COFFIN & CO.,**  
8 Oliver Street, Boston.

### Valuable Furnace Property

#### and Mineral Lands

### FOR SALE.

The assignees of McKnight, Porter & Co. will offer at Public Sale, at Monticello Furnace, Cowanshannock Station, Allegheny Valley Railroad, On Wednesday, July 19, 1876, at 10 o'clock A. M., that valuable property known as the

**MONTICELLO FURNACE,**  
consisting of about three hundred acres of land, on which is erected a blast furnace, with all necessary buildings. Coal and ore banks contiguous.

Also about one thousand acres of valuable land, underlaid with coal, iron ore and limestone. This land is on opposite side of river from furnace.

The furnace has been in blast within six months, and everything is in order for immediate operation. For any further information, address,

**EDWIN MILES and JOHN W. WILEY,**  
Assignees,  
Pittsburgh, Pa.,

who will forward circular giving detailed description of property.

**E. MILES,**  
**J. W. WILEY,** Assignees.

### FOR SALE.

# Trade Report.

Office of THE IRON AGE,  
WEDNESDAY EVENING, June 28, 1876.

The past week has been one of more than ordinary dullness in the financial markets, partly because of the dullness in all departments of business, and partly because of the extreme heat, which has driven from the city a large number of the free lances of Wall street, who amuse themselves, and at the same time make a living, by raising a disturbance whenever opportunity offers. Money continues abundant and easy for borrowers on call at 1 1/2 per cent. The discount rate on prime mercantile paper is 3 1/2 to 5 per cent. Under the influence of the Treasury interest disbursements, gold declined to 11 1/2. Foreign exchange has been strong, the rate on prime bankers' bills being 4-90 to 4-90 1/2.

The decline in the value of silver in London to 78 cents per oz. of coin standard makes the proposed silver dollar worth only 84 1/2 cents, gold, while the smaller silver coinage is worth only 79 1/2 cents to the dollar. Fractional currency, on the other hand, is worth 89 1/2 cents to the dollar. This shows the fallacy of all arguments in favor of making silver a standard of value. The redemption of paper currency worth 89 1/2 cents, gold, in subsidiary silver coin worth only 79 1/2 cents is very like a farce. This backward progress will be a long time leading us back to the point of resumption upon a gold basis. We give below the daily range of the gold premium since our last report:

	Highest.	Lowest.
Thursday.....	112 1/2	112 1/2
Friday.....	112 1/2	112 1/2
Saturday.....	112 1/2	112 1/2
Sunday.....	112 1/2	112 1/2
Tuesday.....	112 1/2	112 1/2
Wednesday.....	112 1/2	112 1/2

Government bonds are in good demand and strong, notwithstanding the decline in gold. State bonds are dull, but prices are fairly maintained. Railway mortgages are strong, especially those of the Wisconsin roads. We give below the quotations of government bonds at the close of business to-day.

The stock market has been heavy. The railroad war has not yet reached a truce, and will probably continue some weeks longer. The principal speculation has been in Lake Shore, Western Union, Northwestern, New Jersey Central, St. Paul, Michigan Central, Delaware, Lackawanna & Western and Pacific Mail. We give below the quotations of active shares at the close of business to-day.

The following is a comparison of the bank averages for the past two weeks:

	June 17.	June 24.	Differences.
Loans.....	\$346,862,100	\$348,397,400	Inc. \$1,535,300
Specie.....	15,318,300	14,900,400	Dec. 417,900
Legal tenders.....	54,380,100	54,380,100	Dec. 156,100
Deposits.....	308,602,000	303,751,800	Inc. 4,850,200
Circulation.....	15,616,400	15,603,500	Dec. 2,900

The following tables show the movements in foreign trade:

For the week ended June 24:

	1874.	1875.	1876.
Total for week.....	\$6,616,571	\$6,994,666	\$4,492,551
Prev. reported.....	\$6,507,010	\$6,912,671	\$4,006,396

Since Jan. 1.....\$11,153,581 \$17,747,318 \$153,498,947

Among the imports of general merchandise were articles valued as follows:

	Quant.	Value.
Arrivals.....	1,100	\$858
Brass goods.....	7	351
Bronzes.....	14	1,491
Chains and anchors.....	10	629
Copper.....	35	13,467
Cutlery.....	1	225
Gas fixtures.....	1	4,141
Guns.....	35	707
Hardware.....	8	300
Iron, pig, tons.....	116	3,697
Iron, other, tons.....	500	984
Lead, pigs.....	2,355	15,243
Metal goods.....	131	10,771
Needles.....	8	292
Old metal.....	3	8,121
Plated ware.....	3	116
Per. caps.....	11	1,957
Saddlery.....	1	1,210
Shed.....	1	17,825
Tie, boxes.....	29,119	119,617
Tin, 1944 slabs.....	130,310	20,152
Wire.....	152	3,864

EXPORTS, EXCLUSIVE OF SPECIE.

For the week ended June 27:

	1874.	1875.	1876.
Total for week.....	\$2,191,644	\$2,315,553	\$6,074,504
Prev. reported.....	\$1,759,083	\$1,538,343	\$2,906,209

Since Jan. 1.....\$14,980,677 \$12,751,996 \$125,965,103

For the week ended June 24:

	1874.	1875.	1876.
Total for week.....	\$2,191,644	\$2,315,553	\$6,074,504
Previously reported.....	1,914,785		

Same time in 1875.....\$2,513,502

Same time in 1876.....\$1,959,961

Same time in 1877.....\$742,715

Government bonds at the close were strong and higher. We quote:

	Bid.	Asked.
U. S. Currency.....	110 1/2	110 3/4
U. S. 6s 1881, reg.....	110 1/2	110 3/4
U. S. 6s 1881, cou.....	110 1/2	110 3/4
U. S. 5-20 1882, reg.....	110 1/2	110 3/4
U. S. 5-20 1882, cou.....	110 1/2	110 3/4
U. S. 5-20 1883, new reg.....	110 1/2	110 3/4
U. S. 5-20 1883, cou.....	110 1/2	110 3/4
U. S. 5-20 1887, reg.....	110 1/2	110 3/4
U. S. 5-20 1887, cou.....	110 1/2	110 3/4
U. S. 5-20 1892, reg.....	110 1/2	110 3/4
U. S. 5-20 1892, cou.....	110 1/2	110 3/4
U. S. 10-40 reg.....	110 1/2	110 3/4
U. S. 10-40 cou.....	110 1/2	110 3/4
U. S. 6s 1881, reg.....	110 1/2	110 3/4
U. S. 6s 1881, cou.....	110 1/2	110 3/4
Central Pacific Gold Bonds.....	110 1/2	110 3/4

The latest and closing quotations were as follows:

	Bid.	Asked.
Atlantic & Pacific R.R. Preferred.....	2 1/2	2 3/4
Atlantic & Pacific Telegraph.....	37 1/2	38 1/2
Chicago & Northwestern.....	43 1/2	44 1/2
Chicago, Rock Island and Pacific.....	109 1/2	110 1/2
Chic. & Ind. Cent.....	34 1/2	35 1/2
Clev. Col. & Ind. Cent.....	41 1/2	42 1/2
Cleveland and Pittsburgh.....	92 1/2	93 1/2
Chicago & Alton.....	102 1/2	103 1/2
Consolidation Coal.....	40 1/2	41 1/2
Del. Lack. and Western.....	107 1/2	108 1/2
Delaware & Hudson Canal.....	108 1/2	109 1/2
Adams Express.....	58 1/2	59 1/2
United States Express.....	71 1/2	72 1/2
Wells, Fargo & Co. Express.....	80 1/2	81 1/2
Erle.....	139 1/2	140 1/2
Hannibal & St. Joseph.....	133 1/2	134 1/2
Illinois Central.....	98 1/2	99 1/2
Kansas & Texas.....	56 1/2	57 1/2
Lake Shore.....	51 1/2	52 1/2
Michigan Central.....	50 1/2	51 1/2
Morris & Essex.....	101 1/2	102 1/2
Milwaukee & St. Paul.....	41 1/2	42 1/2
Mariposa.....	70 1/2	71 1/2
Prof.....	10 1/2	11 1/2

## GENERAL HARDWARE.

The intense heat which has prevailed during the week is unfavorable to any improvement in business, and our market is as dull and inactive as is usual in midsummer. An effort is being made to form a combination among the manufacturers of Strap and T Hinges, which, we are informed, is almost consummated, and which will include the makers both East and West.

Graham & Haines, agents for the Wheeling Hinge Co., have received instructions not to sell better than at discount 55 and 5 per cent., and the Stanley Works quote the same figures. No circulars to that effect have yet been issued.

The American Screw Company will issue the following circular on the 1st prox:

(No. 8.) PROVIDENCE, July 1, 1876.

TO THE HARDWARE TRADE: Having reduced our surplus stock of manufactured goods, we solicit for the month of July your orders upon the following terms and conditions:

	Per Cent. Dis.
Flat Head Iron Wood Screws.....	55
Round Head Iron ".....	45
Stove Bolts.....	45
Tire Bolts, best quality.....	75
Iron Black, Iron Tinned, and Black and Carriage Rivets.....	60
Rivets in Bulk.....	45
Coach Screws.....	55

Terms cash within 30 days from date of invoice. For export trade special prices and terms will be given upon application.

As we have a large accumulation of orders, and, possibly, may not be able to complete all received in July, any unexecuted will be considered cancelled, or filled subject to rates ruling when goods are shipped, as parties ordering may elect.

Payments in funds at par in Boston, New York, Philadelphia or Baltimore.

Soliciting your orders, we remain,

Yours, very respectfully,

AMERICAN SCREW CO.

It will be seen by the above that the price of Flat Head Iron and Brass Wood Screws have been advanced about 12 1/2 per cent., and everything on the list for home trade has been advanced more or less, with the exception of Stove Bolts and Coach Screws, which remain at discount 50 per cent., the same as published by them in their circular No. 7, of June 1st.

The Tack Manufacturers' Association held a meeting to-day in Boston, but dispatches received in this city at a late hour give no intimation of any changes.

The manufacturers of Stamped Tinware also held a meeting to-day in this city, but nothing had transpired regarding their action at the close of business.

In Foreign Hardware there is nothing new to notice. The Wiebusch & Hilger Hardware Company have been appointed sole agents for Q. S. Backus, manufacturer of Bit Braces and kindred goods.

The demand for Nails is very light, but the market is firm. We quote as before 10L, \$3-10 per keg, net, with a discount of 10 cents per keg for large orders.

The manufacturers of Wrought Iron Pipe held a meeting on the 15th instant, when the following list for extra and double extra strong Tubes and revised discounts were adopted:

On net amounts up to \$100, 45 % only.

On \$100 and up to \$500, 44 1/2 % from net.

On \$500 and up to \$1,000, 43 1/2 % from net.

On \$1,000 and up to \$5,000, 42 1/2 % from net.

At time of rendering invoice 45 per cent. only to be deducted, and at end of calendar month the extra discount to be calculated and credited according to this scale.

This applies, of course, only to monthly accounts. Single bills adjusted at the time of purchase, according to the scale.

Buyers paying "spot cash" on receipt of invoice and bill of lading will be allowed an invoice discount of 1 per cent. from the net amount of invoices.

On plans of Pipe cut to special lengths, or according to diagram, the discount will be 40 per cent., with extra discounts as per sliding scale according to amounts purchased.

PRICE LIST EXTRA AND DOUBLE EXTRA STRONG WROUGHT IRON PIPE.

Size.	Extra Strong.	Double Extra Strong.
3 in.....	13	14
4 in.....	13	14
5 in.....	13	14
6 in.....	13	14
8 in.....	13	14
10 in.....	13	14
12 in.....	13	14
14 in.....	13	14
16 in.....	13	14
18 in.....	13	14
20 in.....	13	14
24 in.....	13	14
30 in.....	13	14
36 in.....	13	14
42 in.....	13	14
48 in.....	13	14
54 in.....	13	14
60 in.....	13	14

The Corrugated Elbow Company, Cincinnati, Ohio, have issued the following revised price list for Flat Crimped Elbows and Galvanized Leader Pipe. They quote Flat Crimped Elbows discount 15 per cent., and Galvanized Leader Pipe discount 35 per cent. The office of the company in this city is at No. 52 Cliff street.

Prices of Flat Crimped Elbows.

Size.	Retained or Zinc Gal'd.	Size.	Retained or Zinc Gal'd.
3 in.....	per foot, \$1.50	5 in.....	per foot, \$4.50
4 in.....	per foot, 1.75	6 in.....	per foot, 6.00
5 in.....	per foot, 2.00	8 in.....	per foot, 7.00
6 in.....	per foot, 2.25	10 in.....	per foot, 8.50
8 in.....	per foot, 2.75	12 in.....	per foot, 11.00
10 in.....	per foot, 3.25		

Improved Galvanized Leader Pipe.

No. 37 Iron.	No. 37 Iron.
3 in.....	per foot, 1.50
4 in.....	per foot, 1.75
5 in.....	per foot, 2.00
6 in.....	per foot, 2.25
8 in.....	per foot, 2.75
10 in.....	per foot, 3.25

J. Clark Wilson & Co., have issued the following revised price list for Snell's Boring Machine Augers, to take effect July 1, showing

an advance on all the sizes; the discount remains as before:

Snell's Boring Machine Augers.				
Inch.....	1 1/4	1 1/2	1 3/4	2
Per foot.....	\$10.00	\$12.00	\$14.00	\$16.00
12 in. 18 quaters, per set.....				\$3.50

They quote the Cottage Fly Trap at \$6 per dozen, discount 10 per cent., and report an active demand for these seasonable goods.

Under date of July 1st, the Yale Lock Company have issued a new catalogue and price list, which is a handsome volume of 234 pages, finely illustrated. Since the issue of their last catalogue they have largely increased their line of Yale Locks, and have reduced the prices of many of the leading styles. They have also added the following lines to their business: Ornamental Real Bronze Hardware, the "Standard" Locks; a full line of Mortise Tumbler Locks, with flat steel nickel-plated keys; Weston's Differential Pulley Blocks; Weston's Patent Hoists and Brakes. A new line of Safety Hoisting apparatus, possessing some new and valuable features. Of their new line of "Standard" Locks, they say: "In the manufacture of these Locks (knowing that a demand exists for goods of a high grade), we have been guided throughout by the one consideration of quality, which includes strength, durability, finish and excellence of material and design. Therefore we make use only of brass springs, steel tumblers, heavy brass or bronze faces, heavy bronze bolts, and other parts stronger than found in ordinary goods. An inspection of our prices will show them to be as low as is compatible with first-class work and materials."

To parties ordering goods this book will be sent with first shipment. To others in the trade it will be forwarded on application and on receipt of fifty cents, to cover cost of forwarding, or will be delivered without charge anywhere in New York city. Their price list is accompanied by a discount sheet, dated July 1, giving the following prices:

	D. S. per cent.
Yale Locks (except Prison Locks).....	40
Prison Locks.....	20
Iron Hooks.....	40
"Standard" Locks.....	40
Lead & Cast Fixtures.....	40
Ornamental Real Bronze Goods.....	40
Post Office Lock Boxes and Drawers.....	10
Weston's Differential Pulleys.....	25
Extra Parts for Differential Pulleys.....	15
Dottener's Patent Car Locks.....	10
"Yale" Anodes (for Plating).....	10

In addition to quantity discounts on large orders, as per list.

Prices for Master Key Work, Sample Blocks (exclusive of Locks thereon), and advertising cards are net.

The closing of Hardware houses in this city from Saturday, July 1st, to Wednesday, July 5th, will be very general, and other branches of trade have joined in the movement. In this connection we publish the following letter, which was sent to us by a Philadelphia Hardware house, on the same subject:

PHILADELPHIA, June 27, 1876.

Editor of The Iron Age—Dear Sir:

A large number of our jobbing Hardware dealers have signed an agreement closing their places of business at the regular hour for closing on Saturday afternoon, July 1st, and keeping them closed until Wednesday morning, July 5th, at the regular hour for opening, so that virtually there will be a holiday, by the Hardware trade of this city, for three days following the 1st.

J. Clark Wilson & Co. have in stock Round English Pattern Scythe Sticks, which they claim to be the best goods of their class in the market. They offer them to the trade at \$10 per 100 net.

We print below the revised prices for heavy Hardware, issued by Lewis Oliver & Phillips, Pittsburgh, Pa., which came to hand too late to appear in its accustomed place:

The following are the Card rates, f. o. b. in Pittsburgh of Lewis Oliver & Phillips, H. B. Newhall, 11 Warren St. New York, Agents.

Iron, standard list assorted sizes, for large orders, special quotations to include Bands, small Rounds and Ovals, 7 1/2 % rate, 2 1/2 % off net.

Merchant Bar Iron, as per terms named above.

Flat Rail (14x14), punched and cou'n'..... 1/2 % off net

Iron Wrenches, 25 and 30 boxes, 1/2 % off net

Norway Nail Rods..... 1/2 % off net

Iron Crow Bars (in ordering please state size)..... 1/2 % off net

Best Quality "Rods" or "Pins" polished..... 1/2 % off net

Best Quality "Rods" or "Pins" polished..... 1/2 % off net

Best Quality "Rods" or "Pins" polished..... 1/2 % off net

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Best Quality "Rods" or "Pins" polished..... 1/2 % off net

Best Quality "Rods" or "Pins" polished..... 1/2 % off net



across to your daily papers, has had a tendency to make matters appear better than they had for some time previously looked, and we are now in the hope that the Sick Man's latest convulsion may pass away without being the cause of a general blaze of war. Nobody here for a moment endeavors to extenuate the existence of European Turkey *per se*, but merely as a stop gap, as an admirable check to the movements eastward of the "Wily Mu-covite"—as the newspaper writers of a certain stamp term the Russians. As I have stated in a former letter, we are content to let the government pursue its own course, being fully convinced that its policy at this critical juncture has been dignified without being unduly inflated, calm without being passive, and powerfully impressive without making any fuss. We are still preparing for any eventuality that may lead us into a war. The Rupert ram has been launched and is being made fit for sea. The Himalaya is to be instantly refitted and made ready for sea at Devonport dockyard by July 6. All naval pensioners under 55 years of age have received notice to hold themselves in readiness for active service, and permission, with special advantages, has been given to all pensioners under 45 to join the naval reserve. Preparations have also been made for dispatching to Malta medical stores for 5000 men over and above the full strength of the squadron now cruising in the Mediterranean. Other preparations are in quiet force, all tending to show that there is still every probability of war arising before long.

**THE COMMERCIAL DISTRESS**  
continues to be more palpable every succeeding week, and in many quarters fears are expressed that we have a very serious immediate future before us. On all sides schemes of reform, retrenchment and additional efforts are visible, being rendered absolutely necessary by the exceedingly hard times which have overtaken us. Already there is a good deal of quiet privation in the humbler ranks of our towns' populations, and as the winter approaches I am afraid much suffering will come about. It is not one trade, or a few industries that are badly employed, but a paralysis which has levelled all the industrial energies of the nation—I might say of the whole world. The *Wilt Mail Gazette*, in an excellent article, written I opine by Mr. W. R. Greg, says: "The three years of distress have cured effectually the undue conversion of floating into fixed capital. They have purged away most of the abuses and excesses of credit; but they have not yet brought down the cost of production to a point which tempts capital by reason of cheapness to rely upon the prompt and effectual response of consumption. Still, rapid progress is being made in that direction. The losses of manufacturers, merchants, dealers and tradespeople have become so general, and the lessened dividends upon all capital invested in jointstock companies have so seriously impaired large classes of incomes, that the process of correction is now at work with accelerated force. During the present year all attempts of trade unions to resist reduction of wages have been more or less defeated, and the decrease of employment has enabled the masters to get rid of the less efficient hands, and thus amend somewhat the circumstances of production. Emigration to the United States and Canada is almost stopped, and steamers from New York bring to Liverpool weekly hundreds of artisans in search of work in the old country."

**QUICK RAILWAY WAGON BUILDING.**  
The Engineer says: "At a recent meeting of the Civil and Mechanical Engineers' Society Mr. R. M. Bancroft, of the engineer staff, Great Northern Railway, and senior vice president of the society, gave the following particulars of a covered goods van, which was made complete by the Ashbury Rolling Stock Construction Company, in one working day: All the ironwork, bolts, axle boxes, wheels and axles were manufactured from pig iron, and the wood work cut out of the log and deals; 4 tons 5 cwt. of pig iron, 4 logs of oak wood and 26 deals were the materials from which the work was done. The work commenced at 7-15 a. m. and was finished at 6-35 p. m.—11 hours 20 minutes—and the van quite complete, was then loaded with ordinary merchandise and forwarded to London by 7 o'clock ordinary goods train. It was unloaded next morning at King's Cross station, and then conveyed to the Exhibition building in South Kensington, where it arrived by 10 o'clock in the forenoon, or within 27 hours of the time when the work was first begun."

This, to put it very mildly, was a truly wonderful feat, but the standing of its narrator is a full warranty of its accuracy. The construction of the van body I can quite "see," so to speak, but I confess that I am rather sceptical as to the wheels. They must have been under the van in good time, and then the run in rough new journals to London—200 miles—at high speed—but no matter, I have in!

**COLLIERS' WAGES.**  
The depreciation of wages in all trades is a matter of much and earnest discussion just now in certain quarters. The men are beginning to see that combination cannot contend against certain circumstances, and that after all the laws of supply and demand "rule the roost." The newspapers are filled with correspondence on both sides the question, but most people are content to "let things slide." In the full assurance that we are gradually descending the scale toward a period of moderate prices. The colliers are, perhaps, most disconcerted at the turn affairs have taken, and some of them appear hugely discontented now that they are unable to feed their grayhounds with beefsteaks and mutton-chops. I do not mean to say that all the miners are of that class, but the genus is a large order, and very despicable in some of its characteristics. Some of the miners are earnest, clever, calculating men, and these soon make their marks. One of them, in writing to the *Sheffield Daily Telegraph* the other day, quoted the following sapient axiom, which, I think, is immensely amusing:

No quantity of pounds shall make 1 stone;  
Twice that amount shall make no quarter;  
No amount of quarters shall be called 1 cwt;  
But 26 cwt. shall be reckoned 1 ton.

This, he says, used to be the rule of the masters, and I regret to say there is but too much truth in the assertion. In some districts the coal owners were guilty of the most outrageous oppression and the poor miners were held merely as so many cattle.

**A GREAT TRADES UNION.**  
The twenty-fifth annual report of the Amalgamated Society of Engineers, which has branches in all parts of Great Britain, the colonies and in America, has just been issued and is, in a condensed form, worthy a perusal: At the close of 1874, there were on the books 45,150 members, and at the end of 1875, 44,082, a difference of 882 in favor of the society. After allowing for all deaths and exclusions, the increase in the number of members during 1874 was 768, or 114 less than last year. The income during the year from all sources amounted to £130,024, 2/3, against £118,556, 4/1 in the preceding

year, an increase of £1,467, 18/15. Expenditure, however, had also increased to the extent of £13,332, 1/15, as £20,482, 14/10 in 1874 had swelled out to £24,371, 16/1 in 1875. The chief cause of this increased outlay was a material difference in the state of trade throughout the society in 1875 as compared with 1874, and thus it would be found that against £19,344, 7/11 expended on donation or out-of-work benefit in 1874, no less than £28,500, 6/ was expended in 1875, a difference against the funds of £9,155, 18/1. Frequent petty trade disputes had caused an increased outlay in contingent benefit to the extent of £1309, 1/3. Despite, however, of an increased expenditure, consequent upon a bad industrial and unsanitary year, the balance in favor of the society had been advanced from £238,989, 10/9, at which it stood at the close of 1874, to £264,641, 12/1, an increase of £25,652, 6/3/4.

**THE BOARD OF TRADE RETURNS**  
made up to the end of May, have just been issued, and show a general decrease, except in the quantity of iron and steel sent off during the month, as compared with the same period of 1875. I suspect that the increase has almost wholly been from South Wales and Monmouthshire. The increase has been in cast or wrought pig, and, in a slight degree, in railroad iron. There was a much larger exportation of coal, coke and patent fuel—the extra quantity over the same month of last year being 305,077 tons—chiefly for Russia, Germany, France, Italy and India. Some of the figures are as follows:

Hardware and Cutlery.			
Month ended 31st May.			
	1875.	1876.	Value.
To Russia	9,565	12,572	£ 9,565
Germany	21,491	19,517	£ 21,491
Holland	9,196	9,968	£ 9,196
France	10,138	11,414	£ 10,138
Spain and Canaries	7,282	11,671	£ 7,282
United States	35,738	24,439	£ 35,738
Spanish West India Islands	8,816	4,926	£ 8,816
Brazil	25,411	21,664	£ 25,411
Argentine Republic	13,489	7,381	£ 13,489
British North America	38,019	18,749	£ 38,019
British India	24,417	25,827	£ 24,417
Australia	51,323	30,633	£ 51,323
Other countries	94,195	84,614	£ 94,195
Total	856,334	803,413	£ 856,334

Iron and Steel.			
Month ended 31st May.			
	1875.	1876.	Value.
Quantity.	Tons.	Quantity.	Tons.
Pig iron	56,796	53,438	97,957
Bar, angle, bolt and rod	24,427	24,113	137,583
Railroad	49,398	50,766	26,259
Wire	3,557	64,673	3,418
Boiler, armor plate, &c.	16,396	272,716	14,946
Tin plates	10,392	250,573	12,112
Cast or wrought	22,775	398,716	29,430
Old for remanufacture	1,480	7,201	3,427
Unwrought steel	2,965	109,393	2,608
Manufactures of steel and iron	1,067	84,724	1,017
Total	218,863	2,325,193	233,056

Of railroad iron the particulars are these:			
	May, 1875.	May, 1876.	5 mos. 1876.
Railroad, of all sorts.	Tons.	Tons.	Tons.
To Russia	9,565	12,572	9,565
Sweden and Norway	6,705	7,222	6,705
Denmark	890	1,264	1,339
Germany	114	289	1,592
Holland	1,336	105	170
Belgium	32	140	32
France	32	6	32
Spain and Canaries	1,035	1,815	5,850
Italy	3,617	3,617	14,461
Turkey	12	1	71
Egypt	191	2	136
United States	1,283	2	96
Brazil	776	1,046	5,514
Peru	312	54	1,709
Chili	2,622	891	1,565
British N. America	3,323	8,008	20,593
India	1,207	7,061	20,593
Australia	6,874	9,468	12,611
Other countries	3,327	9,400	27,125
Total	49,398	50,766	144,738

There has been no alteration in this respect during the week, except a fairly good increase in the quantity of pig shipped. Prices are very quiet, with a steady business doing.

Writing from Glasgow, June 10th, Messrs. James Watson & Co., said: "The tone of the market has been better this week, the price being steady from 57/9 to 57/5, closing sellers at 57/7 1/2, cash. Shipments last week were 11,019 tons, against 8708 tons in the corresponding week of 1875." We quote:

	No. 1.	No. 3.
G. M. R., at Glasgow	58/	58/
Gartsherrie	58/	58/
Coltness	58/	58/
Summerlee	58/	58/
Langcocks	58/	58/
Carbidge	58/	58/
Calder, at Port Dundas	58/	58/
Langcocks, at Ardrossan	58/	58/
Edinburgh	58/	58/
Bedfordshire	58/	58/
Shotts, at Leith	58/	58/
Kinnell, at Boness	58/	58/

**SHIPBUILDING FOR THE COLONIES.**  
On Friday evening a number of gentlemen connected with our antipodean colonies dined together at Glasgow, under the presidency of Sir James Ferguson, late Governor of New Zealand. In the course of a discussion on shipbuilding it was stated that there are now not fewer than 16 steamers in course of construction on the Clyde for our colonies. Mr. Denny, a shipbuilder, of Dumbarton, in the course of the discussion which followed, said the present enormous depression of the shipbuilding trade arose from the fact that during the last ten years great advances had been made in the mode of construction. A ship of given gross tonnage and speed now carried exactly double the cargo it used to. He thought the demand for the colonies would, however, furnish such a demand as would enable to tide over the bad times well. Two thirds of the tonnage now building in his own yard was for New Zealand, and he believed that other favors were likely to be forthcoming.

**THE CLEVELAND IRON TRADE.**  
The following are the returns of this Cleveland Iron-masters' Association, issued June 10th. They are worthy of perusal, as the district is highly and increasingly productive and important:

Males of Pig Iron.			
	Month ending 31st May, 1876.	Month ending 31st May, 1875.	Tons.
	179,688	186,428	
	169,964		
Increase upon April, 1876.	10,043		
Decrease upon May, 1875.	6,740		
Shipments Foreign of Pig Iron from the Port of Middlesbrough.			
	Month ending 31st May, 1876.	Month ending 31st May, 1875.	Tons.
	26,753	22,345	
Corresponding month last year.			
Increase upon May, 1875.	14,408		
Shipments Coastwise of Pig Iron from Port of Middlesbrough.			
	Month ending 31st May, 1876.	Month ending 31st May, 1875.	Tons.
	22,440	21,720	
Corresponding month last year.			
Increase upon May, 1875.	10,990		
Makers' Stocks.			
	31st April, 1876.	31st April, 1875.	Tons.
	113,628	115,567	
Increase upon April, 1875.	5,330		
Stock in Warehouse Stores.			
	May 20th, 1876.		Tons.
	1,985		

**TRADES OF SHEFFIELD.**  
Preliminarily, I may remark that Mr. Joseph Slagg, one of the managing directors of William Jessop & Company (Limited), has been elected chairman of the company, in place of the late Mr. Balstone, who committed suicide, owing, as was stated, to heavy stock exchange losses. I believe Mr. Slagg is pretty well known on your side of the Atlantic, he having been connected with the concern for many years. There has been nothing doing in business during the past week, but owing to the practical settlement of the South York-hire miners' strike on Friday last, there is a feeling of rather more confidence in the future of the iron trade, it being supposed that with cheaper fuel prices may be so reduced as to attract customers who are now deterred from buying iron by the high prices currently quoted. Pig iron is easier on the week from the same reason, and is further slightly depreciated in value by the fact that stocks are increasing in the North of England, Scotland and other iron making districts. Foundry numbers are perhaps in best request, but they are by no means called for in quantities equal to the production, even on its present limited scale. Several of the district blast furnaces are out of blast. One or two are being blown up with dynamite, for the purpose of removing the slag and one or two others, the two at the Thorncliffe Works included, will be blown in again now that the miners' dispute has been disposed of.

The cutlery trades are admittedly growing worse than they have yet been. I hear that one of the largest houses will not resume running its engines, after setting down for Whit-sun-tide, until June 20th. This is about the foremost firm in the American trade. They have never before been so badly engaged. Rodgers & Sons are nearly in an unpromising plight.

**CHARLES CAMMELL & CO., LIMITED.**  
One of the chief subjects of conversation in business circles here this week has been the remarkably good report issued on Saturday last by the directors of Charles Cammell & Co., limited, to the shareholders. I may say that the nominal capital of the company is £1,000,000, of which £200,000 have been paid up. The company's properties are the Cyclops Steel and Iron Works, Sheffield, which have an area of 10 acres 3 roods; the Grimesthorpe Steel Works, Sheffield, area 20 acres 3 roods; the Yorkshire Steel and Iron Works, Fensley, area 25 acres; and a coal colliery, Barnsley, with a coal field of an area of 1300 acres the 9 ft. or Barnsley seam. The dividend recommended by the directors is this year 10 per cent., as against 7 1/2 per cent. last year, the year's profits having been £106,869, as compared with £68,039 in the preceding year. The directors state that notwithstanding the great depression which has existed throughout the steel and iron trades during the year over which the accounts now presented extend, they are glad to state that, with one or two minor exceptions, the several departments have been comparatively well employed, and that the company has been fortunate in having executed during the year several important contracts for iron and steel which had been made some time previous. £20,000 is recommended to be added to the reserve fund. "Reductions in wages," the report continues, "have been made in the various manufacturing departments of the company's business, the present depressed condition of trade having been readily admitted by the workmen, with the exception of those employed in the collieries." It is generally admitted that such a report as this is of an encouraging nature to the shareholders, and that it is well enough known that Cammell & Co. have special departments—armor plate manufacture to wit—which are the source of exceptional activity and profit. The report of John Brown & Co., limited, the other leading local concern, will be issued, I believe, in about a week.

**NATIONAL CONFERENCE OF IRON WORKERS.**  
The annual conference of the National Association of Iron Workers was commenced at Sheffield on Tuesday afternoon, Mr. Ancutt, president of the Association, being in the chair. There were 50 delegates present from various parts of the country, their constituents being said to number from 25,000 to 30,000. A vote of condolence was unanimously passed with the widow of the late Mr. John Kane, formerly the secretary of the Association, and it was resolved to subscribe £300 for the purpose of paying a widow, Mrs. Kane, the sum of £500 given by the North of England iron-masters being devoted to the same end. On Wednesday the conference re-elected Mr. Ancutt as president of the Association, and elected Mr. Edward Trow general secretary. It was resolved to hold the conferences every two years instead of every year, as at present, and to issue the *Ironworker's Journal* monthly instead of fortnightly. The chief feature of the day's proceedings was the adoption of a resolution to centralize the whole of the funds of the Association in the names of the general trustees. On the last day's sitting Mrs. Kane addressed the delegates in a most able manner, telling them the only enemy they had to fear was drink! This, I think, was courageous, to say the least.

**BIRMINGHAM AND DISTRICTS.**  
Here, as in other districts, Whitsun-tide has been a long holiday, and on a resumption it is being found that matters are even worse than they were a fortnight ago. In the iron trade there is in reality very little business being done, but there are, of course, a few forced sales, both by concessions in prices and by the necessity for purchasing for specific purposes. Prices are nominally wholly unchanged, but there is no doubt whatever from what I hear, that makers are making offers in many quarters at several shillings under their quoted prices. The shipping trade for hardware is very rapidly declining. Edge tools, brass foundry and railway rolling stock are, perhaps, selling better than anything else.

**SOUTH WALES.**  
Last week the iron exports were principally to Sundewall, S. Germany, and one or two Mediterranean ports. The quantity was small, amounting to 1513 tons from Cardiff, and 975 tons from Newport. It is said that at Dowlais a new steel rail mill is to be erected, but the rumor wants confirmation, especially under present conditions of trade. South Wales bars are being sent into other than local markets at £6, 5/ to £6, 10/ per ton. Think of that, my friends, and wonder.

**THE METAL MARKETS**  
are still very quiet, in part owing to the unsettled condition of politics.

The *Mining Journal* remarks: "Copper.—The market opened very quiet at the commencement of the week, Chili bars, f. o. b., being quoted at £77 to £77, 10/ ordinary cash terms. The market for Chili during the last fortnight in May having been announced to be only 1100 tons of bars, of which 1050 were for this country and 50 tons for the Continent, the market assumed a firmer appearance, and all descriptions of copper were steadily held at current quotations, but buyers not being willing to launch out upon the favorable announcement of small charters, actual business was very limited. Up to Thursday last this continued to be the condition of the market, but upon that day the firmness which had characterized sellers gave way, and efforts were made to quit holdings in Chili bars and Australian copper. The announcement of a further sale of 1800

tons of Wallaroo copper on the 27th inst. by public auction tended rather to depress the market, as it is surmised that the whole of the last sale has not yet found its way into consumption, and to day's market is very quiet indeed, Chili bars, f. o. b., being quoted £77 to £77, 10/; English tough, £83 to £84; best selected, £84 to £85; strong sheets, £89 to £90; India, 4 by 4, £88; Australian copper, £82, 10/.

**Lead.**—The market continues to be very flat, and good soft English pig is obtainable at £21, 5/, and soft Spanish, without silver, £20, 15/.

**Spelter.**—The demand for Silesian is sufficient to support the market, which is steady at £23, 10/, and English hard spelter rules about £18. Zinc.—During the week 120 tons of London rolled was offered at public auction, of which 80 tons found buyers at £27, 10/, or a reduction of 10/ upon the previous sale. *Quicksilver.*—The market continues quiet, and £9 has been accepted to day. Tin.—This metal has been quiet during the week. The speculative feeling which was apparent some little time ago has completely subsided, and is not likely to be renewed—the fallacy of attempting to raise the value of a metal which is encumbered with a burdensome stock in days of such general stagnation having been proved. Straits tin has been offered to-day, both on the spot and for arrival, at £74, but without finding buyers. The probability is that in the absence of speculation lower prices will shortly ensue. *Tin Plates.*—There is no improvement to record. The demand is still very sluggish; and, although the make is restricted as much as possible, stocks are on the increase, and prices decline. I. C. coke plates are quoted 15/ to 19/ per box.

The following are the latest Liverpool prices:

Iron: f. o. b. in Liverpool, per ton.			
	£ s. d.	£ s. d.	£ s. d.
Merchant bar	7 0 0	7 0 0	7 0 0
Merchant bar, in Wales	6 10 0	6 10 0	6 10 0
Staffordshire	7 10 0	6 10 0	6 10 0
Hoop	8 10 0	8 10 0	8 10 0
Sheet	10 10 0	10 10 0	10 10 0
Rail rod	8 0 0	8 0 0	8 0 0
Bar best selected	7 10 0	6 10 0	6 10 0
Boiler plates	10 0 0	10 10 0	10 0 0

*Tin Plates: f. o. b. in Liverpool, per box.*

	£ s. d.	£ s. d.	£ s. d.
Chbarcoal, I. C.	1 4 0	1 4 0	1 4 0
Coke, I. C.	0 19 6	0 19 6	0 19 6

*Copper: Delivered in Liverpool, per ton.*

	£ s. d.	£ s. d.	£ s. d.
Bolt and Sheathing	91 0 0	91 0 0	91 0 0
Tin	85 0 0	85 0 0	85 0 0
Tough cake	85 0 0	85 0 0	85 0 0
Best selected	86 0 0	86 0 0	86 0 0

## HARDWARE AT THE CENTENNIAL.

### Machinery Hall.

**PECK BROTHERS & COMPANY.**  
The most complete assortment of racking, globe and lock cocks, such as are dealt in extensively by the hardware trade, that we have seen at the Centennial, is exhibited by Peck Brothers & Co., New Haven, Conn., and No. 73 Beekman street, New York. These goods are shown in great variety. Their lock cocks are all provided with the improved small key, recently introduced by this house, and which we are informed has become very popular. In cocks for water coolers they show an immense variety; we counted in plated goods alone of this class over 40 patterns. They also exhibit some very handsome double bath cocks, of which nine distinct patterns are shown; some of these are provided with gold-lined jewel holders, others with fancy acorn tops, and all of them are conspicuous for elegance of design and superior workmanship and finish. We also noticed in their case 46 patterns of basin cocks in nickel, silver plate and brass, and a complete assortment of chain stays to match. Beside the brass cocks, already referred to, they exhibit a large variety of larger tier cocks of the heavy pattern required for this trade. These goods, which are a specialty with this house, are shown in 15 patterns. They also exhibit hose pipes and couplings, compression, plug, plain and screw tips, with hose sprinklers and couplings, of all sizes; some handsome beer pumps, a full line of hydrant cocks, steam fitters' and brewers' goods, butlers' pantry cocks in large variety, with and without glass holders. This house also makes a specialty of corporation stops, and they exhibit these goods in all the various patterns required by different cities throughout the country. They are shown with and without cut traps, and in size 1/2 to 2 inches diameter. Some idea of the extent and detail of this business will be inferred from the fact that Messrs. Peck Bros. & Co. exhibit in their case 1000 different patterns of cocks. The goods are very tastefully arranged, and are, all of them, specimens taken from their regular stock.

**THE HARDY PATENT PICK CO. (LIMITED),** Sheffield, England, exhibit for the first time in this country a very large assortment of cast steel picks, with interchangeable handles, for mining, quarry, railroad and other purposes. They also exhibit steel hammers, sledges, spike mauls, &c., all of which are arranged for use on the same handle that is supplied with the pick. We take the following from their circular, showing the advantages claimed for these tools: "1. Effectiveness.—The picks being of a special cast steel, will attack the hardest materials usually found in mining, without yielding or breaking; the cut is much keener than that of the ordinary pick, and the blow more solid. 2. Portability.—One handle only being required for any number of picks, and this need seldom be brought out of the mine, unless used as a walking stick. 3. Firmness.—Of the picks upon their handles. No amount of work can loosen them, or move the tool out of right angles with its handle. 4. Strength.—Both for cutting and 'prizing' they are much stronger than the common pick. 5. Durability.—In the mines of Great Britain, where these picks are in extensive use, they are found to last four or five years without needing repairs, while the ordinary picks require re-steeling every six months, or oftener. The handles are of the choicest American hickory, and are protected from wear or injury, where the ordinary pick handles usually wear or break by the malleable iron socket, which is a fixture upon the handle. 6. Convenience.—In every way, the care and carriage of so many tools and handles are saved, and especially in sharpening, which is done at the smith's forge, in the ordinary manner, but without the handles; thus they take up less

room, and are more handy to the smith, and no handles are scorched or burnt. Contractors will find them very convenient for transport and for locking up when not in use, as detached, they occupy little space. 7. Economy.—One pick does the work of four or five ordinary picks before becoming dull. Two or three picks (which may be of different weights) and one handle are sufficient outfit for a collier, where eight or ten ordinary picks would be required." The picks on exhibition are full polished. The sockets for the handles are made of malleable iron, samples of which are shown bent under great pressure, and free from fracture. Surmounting this exhibit, which is tastefully arranged, is the motto "The pick is mightier than the sword."

### HOOPES & TOWNSEND.

Philadelphia, make one of the most interesting exhibits of bolts, nuts, washers and kindred goods that is to be found at the Centennial. The following description of their pavilion in Machinery Hall is an extract from the *New York Tribune* of recent date: "A square pavilion of neat and tasteful design, constructed throughout of polished walnut, incloses a floor space of over 300 square feet, and has a height of 18 feet. To its sides are attached bolts and nuts of every conceivable form and size; irons for railroad car trucks; forgings, etc., for buildings, flat link chain for elevators, etc., all artistically arranged so as to strike the eye in the most pleasing manner. On the floor of the space (which is covered with a rich velvet carpet) are a series of bins filled with the varied manufactures of this firm, in order that they may be handled and critically examined by those interested in this class of goods. The design of one of the walls of this inclosure is worthy of special mention. The initial letters of the thirteen original States form an arch. These letters are formed with bolts and the arch is outlined with a flat link elevator chain. The keystone of the arch is formed of boiler rivets. The keystone is the copyrighted trade-mark adopted for these rivets, and the whole form a design at once appropriate and effective." The display of rivets is very large, including cone head, button head, countersunk button head, countersunk flat head, etc., from No. 10 to 1 1/2 inch. They also show taps and dies, car irons, belt bolts, railroad track bolts and bolts in the following varieties: square head, hexagon head, button head, button head square countersunk, button head square under, blank bolts, bolt ends, etc.; rods for roofs and bridges, and swivels for 1/2 to 3 1/2 inch rods, pipe swivels, building irons, wood screws, set screws, patch bolts, elevator chains, forged nuts, cold pressed nuts, both square and hexagon, from 1/2 to 2 inch. They also exhibit sections of boiler plate showing difference between hand and machine riveting. A bar of iron 1 1/2 inches thick, punched cold with a 7-16 punch; the length of the punching, which is also shown, is compressed to barely 1/4 inch. This is one of the most remarkable exhibits of cold punching we have seen.

### CHARLES PARKER.



across to your daily papers, has had a tendency to make matters appear better than they had for some time previously looked, and we are now in the hope that the Sick Man's latest convulsion may pass away without being the cause of a general blaze of war. Nobody here for a moment endeavors to extenuate the existence of European Turkey *per se*, but merely as a stop gap, as an admirable check to the movements eastward of the "Wily Mu-covite"—as the newspaper writers of a certain stamp term the Russians. As I have stated in a former letter, we are content to let the government pursue its own course, being fully convinced that its policy at this critical juncture has been dignified without being unduly inflated, calm without being passive, and powerfully impressive without making any fuss. We are still preparing for any eventuality that may lead us into a war. The Rupert ram has been launched and is being made fit for sea. The Himalaya is to be instantly refitted and made ready for sea at Devonport dockyard by July 6. All naval pensioners under 55 years of age have received notice to hold themselves in readiness for active service, and permission, with special advantages, has been given to all pensioners under 45 to join the naval reserve. Preparations have also been made for dispatching to Malta medical stores for 5000 men over and above the full strength of the squadron now cruising in the Mediterranean. Other preparations are in quiet force, all tending to show that there is still every probability of war arising before long.

#### THE COMMERCIAL DISTRESS

continues to be more palpable every succeeding week, and in many quarters fears are expressed that we have a very serious immediate future before us. On all sides schemes of reform, retrenchment and additional efforts are visible, being rendered absolutely necessary by the exceedingly hard times which have overtaken us. Already there is a good deal of quiet privation in the humber ranks of our towns' populations, and as the winter approaches I am afraid much suffering will come about. It is not one trade, or a few industries that are badly employed, but a paralysis which has levelled all the industrial energies of the nation—I might say of the whole world. The *Full Mill Gazette*, in an excellent article, written I opine by Mr. W. R. Greg, says: "The three years of distress have cured effectually the undue conversion of floating into fixed capital. They have purged away most of the abuses and excesses of credit; but they have not yet brought down the cost of production to a point which tempts capital by reason of cheapness to rely upon the prompt and effectual response of consumption. Still, rapid progress is being made in that direction. The losses of manufacturers, merchants, dealers and tradespeople have become so general, and the lessened dividends upon all capital invested in jointstock companies have so seriously impaired large classes of incomes, that the process of correction is now at work with accelerated force. During the present year all attempts of trade unions to resist reduction of wages have been more or less defeated, and the decrease of employment has enabled the masters to get rid of the less efficient hands, and thus amend somewhat the circumstances of production. Emigration to the United States and Canada is almost stopped, and steamers from New York bring to Liverpool weekly hundreds of artisans in search of work in the old country."

#### QUICK RAILWAY WAGON BUILDING.

The Engineer says: "At a recent meeting of the Civil and Mechanical Engineers' Society Mr. R. M. Bancroft, of the engineer staff, Great Northern Railway, and senior vice-president of the society, gave the following particulars of a covered goods van, which was made complete by the Ashbury Rolling Stock Construction Company, in one working day: All the iron-work, bolts, axle boxes, wheels and axles were manufactured from pig iron, and the wood work cut out of the log and deals; 4 tons 5 cwt. of pig iron, 4 logs of teak wood and 26 deals were the materials from which the work was done. The work commenced at 7-15 a. m. and was finished at 6-35 p. m.—11 hours 20 minutes—and the van quite complete, was then loaded with ordinary merchandise and forwarded to London by 7 o'clock ordinary goods train. It was unloaded next morning at King's Cross station, and then conveyed to the Exhibition building in South Kensington, where it arrived by 10 o'clock in the forenoon, or within 37 hours of the time when the work was first begun."

This, to put it very mildly, was a truly wonderful feat, but the standing of its narrator is a full warranty of its accuracy. The construction of the van body I can quite "see," so to speak, but I confess that I am rather sceptical as to the wheels. They must have been under the van in good time, and then the run in rough new journals to London—300 miles—at high speed—but no matter, I have it!

#### COLLIERS' WAGES.

The depreciation of wages in all trades is a matter of much and earnest discussion just now in certain quarters. The men are beginning to see that combination cannot contend against certain circumstances, and that after all the laws of supply and demand "rule the roost." The newspapers are filled with correspondence on both sides the question, but most people are content to "let things slide." In the full assurance that we are gradually descending the scale toward a period of moderate prices. The colliery affairs have taken, and some of them appear hugely discontented now that they are unable to feed their grayhounds with beefsteaks and mutton-chops. I do not mean to say that all the miners are of that class, but the genus is a large order, and very despicable in some of its characteristics. Some of the miners are earnest, clever, calculating men, and these soon make their marks. One of them, in writing to the *Sheffield Daily Telegraph* the other day, quoted the following sapient axiom, which is, I think, immensely amusing:

No quantity of pounds shall make 1 stone;  
Twice that amount shall make no quarter;  
No amount of quarters shall be called 1 cwt;  
But 26 cwts. shall be reckoned 1 ton.

This, he says, used to be the rule of the masters, and I regret to say there is but too much truth in the assertion. In some districts the coal owners were guilty of the most outrageous oppression and the poor miners were held merely as so many cattle.

#### A GREAT TRADES UNION.

The twenty-fifth annual report of the Amalgamated Society of Engineers, which has branches in all parts of Great Britain, the colonies and in America, has just been issued and is, in a condensed form, worthy a perusal: At the close of 1874, there were on the books 46,150 members, and at the end of 1875, 44,082, a difference of 2,068 in favor of the society. After allowing for all deaths and exclusions, the increase in the number of members during 1875 was 768, or 14 less than last year. The income during the year from all sources amounted to £130,024, 3/3, against £118,566, 4/14 in the preceding

year, an increase of £1,457, 18/14. Expenditure, however, had also increased to the extent of £13,382, 1/14, as £20,483, 14/10 in 1874 had swelled out to £34,371, 16/1 in 1875. The chief cause of this increased outlay was a material difference in the state of trade throughout the society in 1875 as compared with 1874, and thus it would be found that against £19,344, 7/11 expended on donation or out-of-work benefit in 1874, no less than £38,500, 6/7 was expended in 1875, a difference against the funds of £19,155, 18/1. Frequent petty trade disputes had caused an increased outlay in contingent benefit to the extent of £1,299, 1/3. Despite, however, of an increased expenditure, consequent upon a bad industrial and unsanitary year, the balance in favor of the society had been advanced from £238,989, 10/9, at which it stood at the close of 1874, to £264,641, 12/1, an increase of £25,652, 6/3.

#### THE BOARD OF TRADE RETURNS

made up to the end of May, have just been issued, and show a general decrease, except in the quantity of iron and steel sent off during the month, as compared with the same period of 1875. I suspect that the increase has almost wholly been from South Wales and Monmouthshire. The increase has been in cast or wrought pig, and, in a slight degree, in railroad iron. There was a much larger exportation of coal, coke and patent fuel—the extra quantity over the same month of last year being 305,077 tons—chiefly for Russia, Germany, France, Italy and India. Some of the figures are as follows:

Hardware and Cutlery.			
Month ended 31st May.			
	1875.	1876.	Value.
To Russia.....	9,765	13,572	2
Germany.....	21,491	19,517	1
Holland.....	9,196	9,986	1
France.....	10,138	11,414	1
Spain and Canaries.....	7,288	11,071	1
United States.....	35,738	32,169	1
Spanish West India Islands.....	8,616	4,926	1
Brazil.....	35,411	21,664	1
Argentine Republic.....	13,469	7,281	1
British North America.....	38,019	18,749	1
British India.....	24,417	25,927	1
Australia.....	51,392	50,653	1
Other countries.....	94,136	84,614	1
Total.....	855,394	803,413	

Iron and Steel.			
Month ended 31st May.			
	1875.	1876.	Value.
Pig iron.....	86,796	93,498	97,867
Bar, angle, bolt and rod.....	24,427	24,113	17,935
Railroad.....	49,398	50,766	50,299
Wire.....	3,167	64,673	3,418
Boiler, armor plates, &c.....	16,596	37,716	14,946
Tin plates.....	10,392	390,573	12,112
Cast or wrought.....	22,775	398,716	29,430
Old for remanufacture.....	1,480	7,201	3,437
Manufacture of steel and iron.....	2,965	109,598	2,600
Total.....	1,067	84,724	1,017

Total..... 218,863 2,325,133 233,056 2,082,981

Of railroad iron the particulars are these:			
	May, 1875.	May, 1876.	5 mos. 1876.
Railroad, of all sorts.....	1875.	1876.	1876.
To Russia.....	9,256	7,628	7,628
Sweden and Norway.....	6,705	7,322	22,336
Denmark.....	890	1,256	1,339
Germany.....	114	289	1,522
Holland.....	1,336	105	170
Belgium.....	34	140	140
France.....	32	6	30
Spain and Canaries.....	1,043	1,815	5,850
Italy.....	3,617	14,461	14,461
Turkey.....	12	1	1
Egypt.....	190	1	136
United States.....	1,283	2	96
Brazil.....	776	1,046	5,514
Peru.....	312	54	1,709
Chili.....	2,622	891	1,523
British N. America.....	13,343	8,603	20,578
India.....	1,277	7,061	20,570
Australia.....	6,874	2,609	12,611
Other countries.....	3,327	9,400	27,125
Total.....	49,298	50,299	144,723

There has been no alteration in this respect during the week, except a fairly good increase in the quantity of pig shipped. Prices are very quiet, with a steady business doing.

Writing from Glasgow, June 10th, Messrs. James Watson & Co. say: "The tone of the warrant market has been quieter this week, the price being steady from 57/9 to 57/8, closing sellers at 57/7 1/2, cash. Shipments last week were 11,019 tons, against 8708 tons in the corresponding week of 1875." We quote:

	No. 1.	No. 3.
G. M. B. at Glasgow.....	58/	58/
Gartsherrie.....	65/6	58/
Coltness.....	69/	58/
Summerlee.....	68/	58/
Lancaster.....	68/	58/
Carbidge.....	61/	57/6
Calder, at Port Dundas.....	66/	57/6
Langarock, at Ardrossan.....	63/6	58/
Eginton.....	57/6	58/
Delnashott.....	57/6	58/
Shotts, at Leith.....	68/	56/6
Kinnell, at Boness.....	59/6	56/

#### SHIPBUILDING FOR THE COLONIES.

On Friday evening a number of gentlemen connected with our antipodean colonies dined together at Glasgow, under the presidency of Sir James Fergusson, late Governor of New Zealand. In the course of a discussion on shipbuilding it was stated that there are now not fewer than 16 steamers in course of construction on the Clyde for our colonies. Mr. Denny, a shipbuilder, of Dumbarton, in the course of the discussion which followed, said the present enormous depression of the shipbuilding trade arose from the fact that during the last ten years great advances had been made in the mode of construction. A ship of given gross tonnage and speed now carried exactly double the cargo it used to. He thought the demand for the colonies would, however, furnish such a demand as would enable to tide over the bad times well. Two thirds of the tonnage now building in his own yard was for New Zealand, and he believed that other favors were likely to be forthcoming.

#### THE CLEVELAND IRON TRADE.

The following are the returns of this Cleveland Iron-masters' Association, issued June 10th. They are worthy of perusal, as the district is highly and increasingly productive and important:

Make of Pig Iron.			
	Tons.		Tons.
Month ending 31st May, 1876.....	179,688		
" " 31st May, 1875.....	186,428		
" " 30th April, 1876.....	169,664		
Increase upon April, 1875.....	10,442		
Decrease upon May, 1875.....	6,740		
Shipments Foreign of Pig Iron from the Port of Middlesbrough.			
Month ending 31st May, 1876.....	26,753		
Corresponding month last year.....	22,345		
Increase upon May, 1875.....	14,408		
Shipments Coastwise of Pig Iron from Port of Middlesbrough.			
Month ending 31st May, 1876.....	32,440		
Corresponding month last year.....	31,750		
Increase upon May, 1875.....	10,660		
Makers' Stocks.			
30th April, 1876.....	113,628		
31st May, 1876.....	115,267		
Increase upon April, 1876.....	2,339		
Stock in Warehouse.			
May 30th, 1876.....	1,985		

#### TRADES OF SHEFFIELD.

Preliminarily, I may remark that Mr. Joseph Slagg, one of the managing-directors of William Jessop & Company (Limited), has been elected chairman of the company, in place of the late Mr. Balstone, who committed suicide, owing, as was stated, to heavy stock exchange losses. I believe Mr. Slagg is pretty well known on your side of the Atlantic, he having been connected with the concern for many years. There has been nothing doing in business during the past week, but owing to the practical settlement of the South Yorkshire miners' strike on Friday last, there is a feeling of rather more confidence in the future of the iron trade, it being supposed that with cheaper fuel prices may be so reduced as to attract customers who are now deterred from buying iron by the high prices currently quoted. Pig iron is easier on the week from the same reason, and is further slightly depreciated in value by the fact that stocks are increasing in the North of England, Scotland and other iron making districts. Foundry numbers are perhaps in best request, but they are by no means called for in quantities equal to the production, even on its present level scale. Several of the district blast furnaces are out of blast. One or two are being blown up with dynamite, for the purpose of removing the slag, and one or two others, the two at the Thorncliffe Works included, will be blown in again now that the miners' dispute has been disposed of.

The cutlery trades are admittedly growing worse than they have yet been. I hear that one of the largest houses will not resume running its engines, after setting down for Whit-sun-tide, until June 20th. This is about the foremost firm in the American trade. They have never before been so badly engaged. Rogers & Sons are nearly in as unpromising a plight.

#### CHARLES CAMMELL & CO., LIMITED.

One of the chief subjects of conversation in business circles here this week has been the remarkably good report issued on Saturday last by the directors of Charles Cammell & Co., limited, to the shareholders. I may say that the nominal capital of the company is £1,000,000, of which £200,000 have been paid up. The company's properties are the Cyclops Steel and Iron Works, including the Howard and Agnew Works, Sheffield, which have an area of 10 acres 2 rods; the Grimsthorpe Steel Works, Sheffield, area 20 acres 3 rods; the Yorkshire Steel and Iron Works, Fenistone, area 25 acres; and the Oaks collieries, Barnsley, with a coal field of an area of 1300 acres of the 9 ft. or Barneley seam. The dividend recommended by the directors is this year 10 per cent., as against 7 1/2 per cent. last year, the year's profits having been £106,869, as compared with £68,039 in the preceding year. The directors state that notwithstanding the great depression which has existed throughout the steel and iron trades during the year over which the accounts now presented extend, they are glad to state that, with one or two minor exceptions, the several departments have been comparatively well employed, and each has contributed toward the profit realized. The company has been fortunate in having executed during the year several important contracts for iron and steel which had been made some time previous. £20,000 is recommended to be added to the reserve fund. "Reductions in wages," the report continues, "have been made in the various manufacturing departments of the company's business, the present depressed condition of trade having been readily admitted by the workmen, with the exception of those employed in the collieries." This is generally admitted, and such a report as this is of an encouraging nature to the trade as a whole, although it is well enough known that Cammell & Co. have special departments—armor plate manufacture to wit—which are the source of exceptional activity and profit. The report of John Brown & Co., limited, the other leading local concern, will be issued, I believe, in about a week.

#### NATIONAL CONFERENCE OF IRON WORKERS.

The annual conference of the National Association of Iron Workers was commenced at Sheffield on Tuesday afternoon, Mr. Ancutt, president of the Association, being in the chair. There were 50 delegates present from various parts of the country, their constituents being said to number from 25,000 to 30,000. A vote of condolence was unanimously passed with the widow of the late Mr. John Kane, formerly the secretary of the Association, and it was resolved to subscribe £500 for the purpose of purchasing an annuity for Mrs. Kane, the £500 given by the North of England iron-masters being devoted to the same end. On Wednesday the conference re-elected Mr. Ancutt as president of the Association, and elected Mr. Edward Trow general secretary. It was resolved to hold the conferences every two years instead of every year, as at present, and to issue the *Ironworker's Journal* monthly instead of fortnightly. The chief feature of the day's proceedings was the adoption of a resolution to centralize the whole of the funds of the Association in the names of the general trustees of the last day's address. Mr. Kane addressed the delegates in a most able manner, telling them the only enemy they had to fear was drink! This, I think, was courageous, to say the least.

#### BIRMINGHAM AND DISTRICTS.

Here, as in other districts, Whitsun-tide has been a long holiday, and on a resumption it is being found that matters are even worse than they were a fortnight ago. In the iron trade there is in reality very little business being done, but there are, of course, a few forced sales, both by concessions in prices and by the necessity for purchasing for specific purposes. Prices are nominally wholly unchanged, but there is no doubt whatever, from what I hear, that makers are making offers in many quarters at several shillings under their quoted prices. The shipping trade for hardware is very rapidly declining. Edge tools, brass foundry and mill-rolling stock are, perhaps, selling better than anything else.

#### SOUTH WALES.

Last week the iron exports were principally to Sundswall, Söderhamn, and one or two Mediterranean ports. The quantity was small, amounting to 1513 tons from Cardiff, and 975 tons from Newport. It is said that at Duwals a new steel rail mill is to be erected, but the rumor wants confirmation, especially under present conditions of trade. South Wales bars are being sent into other than local markets at 26. 5/ to 26. 10/ per ton. Think of that, my friends, and wonder.

The metal markets are still very quiet, in part owing to the unsettled condition of politics.

The Mining Journal remarks: "Copper.—The market opened very quiet at the commencement of the week, Chili bars, g. o. b., being quoted £77 to £77. 10/ ordinary cash last fortnight in May having been announced to be only 1100 tons of bars, of which 1050 were for this country and 50 tons for the Continent, the market assumed a firmer appearance, and all descriptions of copper were steadily held at current quotations, but buyers not being willing to launch out upon the favorable announcement of small charters, actual business was very limited. Up to Thursday last this continued to be the condition of the market, but upon that day the firmness which had characterized sellers gave way, and an effort was made to quit holdings in Chin bars and Australian copper. The announcement of a further sale of 1800

tons of Wallaroo copper on the 27th inst. by public auction tended rather to depress the market, as it is surmised that the whole of the last sale has not yet found its way into consumption, and to day's market is very quiet indeed. Chili bars, g. o. b., being quoted £77 to £77. 10/; English tough, £83 to £84; best selected, £84 to £85; strong sheets, £89 to £90; India, 4 by 4, £88; Australian copper, £82, 10/; Lead.—The market continues to be very flat, and good sheet English pig is obtainable at £21. 5/ and soft Spanish, without silver, £20. 15/. Spelter.—The demand for Silesian is sufficient to support the market, which is steady at £23. 10/ and English hard spelter rules about £18. Zinc.—During the week 130 tons of London rolled was offered at public auction, of which 80 tons found buyers at £27. 10/ or a reduction of 10/ upon the previous sale. Quick-silver.—The market continues quiet, and £9 has been accepted to day. Tin.—This metal has been quiet during the week. The speculative feeling which was apparent some little time ago has completely subsided, and is not likely to be renewed—the failure of attempting to raise the value of a metal which is encumbered with a burdensome stock in days of such general stagnation having been proved. Straits tin has been offered to-day, both on the spot and for arrival, at £74, but without finding buyers. The probability is that in the absence of speculation lower prices will shortly ensue. Tin Plates.—There is no improvement to record. The demand is still very sluggish; and, although the make is restricted as much as possible, stocks are on the increase, and prices decline. L. C. coke plates are quoted 18/ to 19/ per box.

The following are the latest Liverpool prices:

Iron: f. o. b. in Liverpool, per ton.			
	£	s.	d.
Merchant bar.....	7	0	0
Merchant bar, in Water.....	6	10	0
Staffordshire.....	7	10	0
Hoop.....	8	10	0
Sheet.....	10	10	0
Nail.....	8	10	0
Bar, best crown.....	7	10	0
Boiler plates.....	10	0	0
Tin Plates: f. o. b. in Liverpool, per box.			
	£	s.	d.
Charcoal, L. C.....	1	4	0
Coke, L. C.....	0	19	6
Copper: Delivered in Liverpool, per ton.			
	£	s.	d.
Bolt and Sheathing.....	91	0	0
Tin.....	85	0	0
Tough cast.....	85	0	0
Best selected.....	86	0	0

#### HARDWARE AT THE CENTENNIAL.

##### Machinery Hall.

##### PECK BROTHERS & COMPANY.

The most complete assortment of racking, globe and lock cocks, such as are dealt in extensively by the hardware trade, that we have seen at the Centennial, is exhibited by Peck Brothers & Co., New Haven, Conn., and No. 73 Beekman street, New York. These goods are shown in great variety. Their lock cocks are all provided with the improved small key, recently introduced by this house, and which we are informed has become very popular. In cocks for water coolers they show an immense variety; we counted in plated goods alone of this class over 40 patterns. They also exhibit some very handsome double bath cocks, of which nine distinct patterns are shown; some of these are provided with gold-lined jewel holders, others with fancy acorn tops, and all of them are conspicuous for elegance of design and superior workmanship and finish. We also noticed in their case 46 patterns of basin cocks in nickel, silver plate and brass, and a complete assortment of chain stays to match. Beside the brass cocks, already referred to, they exhibit a large variety of larger beer cocks of the heavy pattern required for this trade. These goods, which are a specialty with this house, are shown in 15 patterns. They also exhibit hose pipes and couplings, compression, plug, plain and screw tips, with hose sprinklers and couplings, of all sizes; some handsome beer pumps, a full line of hydrant cocks, steam fitters' and brewers' goods, butlers' pantry cocks in large variety, with and without glass holders. This house also makes a specialty of corporation stops, and they exhibit these goods in all the various patterns required by different cities throughout the country. They are shown with and without oil traps, and in size 1/2 to 2 inches diameter. Some idea of the extent and detail of this business will be inferred from the fact that Messrs. Peck Bros. & Co. exhibit in their case 1000 different patterns of cocks. The goods are very tastefully arranged, and are, all of them, specimens taken from their regular stock.

##### THE HARDY PATENT PICK CO. (LIMITED).

Sheffield, England, exhibit for the first time in this country a very large assortment of cast steel picks, with interchangeable handles, for mining, quarry, railroad and other purposes. They also exhibit steel hammers, sledges, spike mauls, &c., all of which are arranged for use on the same handle that is supplied with the pick. We take the following from their circular, showing the advantages claimed for these tools: "1. Effectiveness.—The picks being of a special cast steel, will attack the hardest materials usually found in mining, without yielding or breaking; the cut is much keener than that of the ordinary pick, and the blow more solid. 2. Portability.—One handle only being required for any number of picks, and this need seldom be brought out of the mine, unless used as a walking stick. 3. Firmness.—Of the picks upon their handles. No amount of work can loosen them, or move the tool out of right angles with its handle. 4. Strength.—Both for cutting and 'prizing' they are much stronger than the common pick. 5. Durability.—In the mines of Great Britain, where these picks are in extensive use, they are found to last four or five years without needing repairs, while the ordinary picks require re-steeling every six months, or oftener. The handles are of the choicest American hickory, and are protected from wear or injury, where the ordinary pick handles usually wear or break by the malleable iron socket, which is a fixture upon the handle. 6. Convenience.—In every way, the care and carriage of so many tools and handles are saved, and especially in sharpening, which is done at the smith's forge, in the ordinary manner, but without the handles; thus they take up less

room, and are more handy to the smith, and no handles are scorched or burnt. Contractors will find them very convenient for transport and for locking up when not in use, as detached, they occupy little space. 7. Economy.—One pick does the work of four or five ordinary picks before becoming dull. Two or three picks (which may be of different weights) and one handle are sufficient outfit for a collier, where eight or ten ordinary picks would be required." The picks on exhibition are full polished. The sockets for the handles are made of malleable iron, samples of which are shown bent under great pressure, and free from fracture. Surmounting this exhibit, which is tastefully arranged, is the motto "The pick is mightier than the sword."

##### HOOPES & TOWNSEND.

Philadelphia, make one of the most interesting exhibits of bolts, nuts, washers and kindred goods that is to be found at the Centennial. The following description of their pavilion in Machinery Hall is an extract from the *New York Tribune* of recent date: "A square pavilion of neat and tasteful design, constructed throughout of polished walnut, incloses a floor space of over 300 square feet, and has a height of 18 feet. To its sides are attached bolts and nuts of every conceivable form and size; irons for railroad car trucks; forgings, etc., for buildings, flat link chain for elevators, etc., all artistically arranged so as to strike the eye in the most pleasing manner. On the floor of the space (which is covered with a rich velvet carpet) are a series of bins filled with the varied manufactures of this firm, in order that they may be handled and critically examined by those interested in this class of goods. The design of one of the walls of this inclosure is worthy of special mention. The initial letters of the thirteen original States form an arch. These letters are formed with bolts and the arch is outlined with a flat link elevator chain. The keystone of the arch is formed of boiler rivets. The keystone is the copyrighted trade-mark adopted for these rivets, and the whole form a design at once appropriate and effective." The display of rivets is very large, including cone head, button head, countersunk button head, countersunk flat head, etc., from No. 10 to 1 1/2 inch. They also show taps and dies, car irons, belt bolts, railroad track bolts and bolts in the following varieties: square head, hexagon head, button head, button head square countersunk

shown are covered with black velvet, forming a pleasing contrast to the polished steel and their surroundings. On one side of this structure there is a door leading into the interior, which is handsomely lined and carpeted, and which forms a convenient office. On the side fronting the Corliss engine is shown a large circular saw with lightning teeth, and surrounding this is a handsome set of segments for cutting veneers, the teeth of which are of the ordinary pattern. Surrounding the circle, very tastefully arranged, are samples of hand, panel, back, butcher, compass, and pruning saws, billet and turning webs, mill saws, pit saws, one man cross-cuts, and the new Centennial lightning cross-cut, patent of March 28, 1876. On other panels he exhibits in great variety files specially adapted for filing the patent lightning and other saw teeth, which require files specially adapted to their shape. We also noticed a combined patent file and saw set; patent saw handle for hooking to end of one man cross-cut when extra power is required; extension rod loop handle for cross-cuts, patented in March last; patent side grasp saw handle; lightning pole and hand pruning saws with two edges; patent cross bar wood saw frames; patent set for setting points of teeth same as with a hammer and anvil, arranged as simply as a pair of tongs, etc. On the top of the structure is shown a lightning cross cut saw, on which is printed in gilt letters "23 cords of wood sawed by hand in eight hours with this saw." On tastefully arranged arches over each of the four sides, and making a handsome finish to the top of the structure, we find the following (Mr. Boynton calls them "mottoes"), in gold letters on black walnut ground: "Business! \$1000 to match the lightning saw;" "Lightning is the only patent saw vindicated by U. S. Court—beware!" "12 inch log cut in eight seconds with hand cross-cut saw;" "16 inch log sawed with hand lightning cross-cut in 17 seconds." In the display of saws mentioned above Mr. Boynton shows, in addition to his special goods with lightning patent teeth, a large variety of hand and other saws with common teeth and in various grades.

#### Main Building.

THE LALANCE & GROSEAN MFG. CO.,

No. 89 Beekman street, N. Y., make a large and very interesting exhibit of deep stamped and japanned tin and sheet iron goods. They also show an immense variety of marbled enameled ironware, which they claim is unequalled for durability and cleanliness, standing intense heat, and not being susceptible of injury from acids of any kind. In this were they exhibit long handled frying pans, fluted gridirons, oval, round and square baking dishes, saucepans both lipped and covered, cullenders, fluted and plain cake molds with and without tubes, pie plates, preserving kettles, wash basins, dish pans, spittoons, water pipe and elbows to be used instead of tin leaders, &c. The same patterns of goods are also shown in blue and white enamel and in decorated enameled ware; they also exhibit plates, oval and round dishes, &c. Handsomely contrasting with the gray blue and white enameled ware described above is a beautiful assortment of planished copper and tin urns, soup tureens, chafing and oyster dishes, &c. In japanned ware they exhibit toilet sets in elegant designs, some beautiful specimens of decalcomanie, water coolers, japanned tables, jardiniere, &c. In retined deep stamped goods they make a very handsome display, showing many specimens of deep stamping which are absolutely marvelous. They also show a large assortment of tinned and enameled basting spoons, tinned forks, ladles, both plain and pierced, copper saucepans, sugar scoops, both tinned and brass, brass preserving kettles, tinned and copper tea kettles, tea and coffee pots, and a large variety of miscellaneous goods in tin, copper, iron and japanned ware. Taking into consideration the fact that Messrs. Lalance & Grosean Mfg. Co. had very recently the misfortune of losing by fire the best equipped factory for the production of their specialties in the United States, if not in the world, the magnificent display made by them is creditable not only for its intrinsic merit, but as an evidence of pluck and energy in overcoming great obstacles in a very short time.

WILSON, HAWKSWORTH, ELLISON & CO.,

Sheffield, England, exhibit table and pocket knives, the former in pearl, ivory, bone, buffalo and composition handles; butcher knives and steels, fine scissors, &c. They also show fine finished machinists' hammers, specimens of steel, flat, square, round, octagon, three-square, &c.; socket firmer chisels and gouges with blued and bronzed sockets; turning chisels, drawing knives, screw drivers, spoke shaves, plane irons, hatchets, mattocks, carpenter's squares, files and rasps, steel wire, and a very handsomely finished specimen of heavy car springs. The carpenter's tools in this exhibit are finished in the very highest possible luster.

WARD & PAYNE,

Sheffield, England, exhibit in a very tasteful manner an immense variety of carpenters', engravers' and carvers' tools, sheep shears, &c. In tanged chisels and gouges they show regular firmers, long thin paring chisels, turning chisels, flat and hollow sweep gouges. They also show a monster firmer chisel with handsome rosewood handle and a gouge to match with boxwood handle. The assortment of wood carving and engraving tools in this exhibit is very full and complete, comprising almost every imaginable variety of these goods. They also show augers and gimlets, wood stock plated bit braces of the well remembered English patterns, assorted boring bits, screw drivers, spoke shaves, carpenters' squares and levels, split levels, marking gauges, &c.; coopers', carpenters' and coach makers' drawing knives, molders' and plasterers' tools, brick and plastering trowels, hatchets, broad axes, mattocks, cleavers, &c., and an immense screw

driver of exquisite finish and beautifully proportioned. The goods exhibited by Messrs. Ward & Payne, while showing care in all of their details, are presented with no higher finish than it is reasonable to expect on first-class goods.

GEORGE WOSTENHOLM & SON,

manufacturers of the celebrated I. X. L. brand of pocket cutlery, etc., Sheffield, England, show a handsome assortment of the finer patterns of pen and pocket knives, scissors, razors, etc. They show in their case medals from Paris, 1855 and 1867, and from the London Exhibition of 1851.

JAMES BURNARD & CO.,

Leicester Works, Sheffield, England, exhibit handsomely finished table knives in ebony, ivory, plated and pearl handles. In table knives only about a dozen patterns are shown. The display of hunting knives in this case is large, handsome and well assorted, a great many sizes being shown. They also exhibit a few samples of pocket and pen knives, nut picks, farriers' knives, cigar and pruning knives.

BROOKES & CROOKES,

Atlantic Works, Sheffield, England, have on exhibition a case of fine cutlery very tastefully arranged; all the goods shown are of the higher grades. In pocket knives they show ivory, pearl, buffalo, shell and stag coverings; some very handsome specimens of pocket knives with scissors and other useful articles in combination. They also show table knives with ivory, pearl, stag, buffalo, self-tip and ornamented ivory handles. Scissors and other goods in cases, cork screws, button books, champagne knives, handsomely finished razors in cases—some of these cases of ivory; hunting knives of exquisite finish with carved ivory handles, picnic knives, forks and spoons in cases, and razors in great variety. All of the goods exhibited by Messrs. Brookes & Crookes are well finished, and in this respect will compare favorably with any similar goods that we have examined.

J. B. ADDIS & SONS,

Sheffield, England, whose reputation as manufacturers of the best quality of wood carvers' and engravers' tools is world-wide, show, in a very small space, a handsome assortment of their goods in almost every conceivable shape and variety. The goods are tastefully arranged.

MAYER & MELTZER,

No. 71 Portland street, London, England, exhibit surgical instruments in great variety. They also show a beautiful assortment of fine pocket knives, scissors and razors; but these goods, we were informed, being higher priced than Sheffield goods of the same class, are comparatively unknown in this market.

HERMANN BOKER & CO.,

Solingen, Prussia, and Nos. 101 and 103 Duane street, New York, make a very fine display of scissors and pocket knives. In the center of a glass case, devoted entirely to fine shears, scissors and kindred goods, is shown a handsome card of scissors of elaborate design and exquisite finish; this card, the ground of which is white cloth handsomely bordered with Russia leather, contains two rows of scissors enclosing their trade-mark. The upper row contains nine scissors, and shows on each, between the bows and blades, a handsomely finished letter in burnished steel, and these placed in part of a circle gives the name of the firm, "H. Boker & Co." The lower row of eight scissors have the same style of letters, forming the word "Solingen." These scissors are attached to the card by means of steel clasps over the blades, and the bows are held in position by miniature scissors in the form of spring clips, the effect of which is pleasing. Among the varieties of scissors exhibited by this house, we notice ladies' fine pointed and embroidery goods, in a great many sizes and patterns; nail scissors, round points; a beautiful line of ladies' shears; scissors for surgical purposes; bent shank and blade scissors for horse clipping; scissors in cases in great variety. Some of these are shown with bows covered with ivory, pearl, leather, etc. The above mentioned goods bear the test of careful examination; the styles are good, and the finish will compare favorably with the choicest productions from Sheffield. In another case they show a large assortment of pocket knives of the finer descriptions. These are shown in all the varieties of shape and coverings required in this market. They also exhibit pocket knives in combination with scissors, cork screws, button hooks and other convenient articles, six large show knives containing an immense variety of blades and tools. The handles of these are very beautifully carved, and are covered both in ivory and shell.

T. HESSENBRUCH & CO.,

Ronsdorf, Prussia, and North 5th street, Philadelphia, exhibits hand and jewelers' vises, cutting pliers in several styles, carpenters' pincers, round and flat nose pliers and kindred goods; also an assortment of pocket knives and scissors.

FREDERICK WELLMAN,

Altona, Hamburg, has on exhibition a very fine assortment of pocket knives, a great many of which are shown with cork screws and other articles of frequent use. He also shows some fine samples of scissors, razors, ivory carvers, and we are informed that he will soon have on exhibition a full line of table knives. He shows medals from the following exhibitions: Altona, 1869; Moscow, Russia, 1872; Vienna, 1873; Luxembourg, 1875; Cologne, 1875; Custrin, Prussia, 1875. These goods are exhibited in this country for the first time.

J. S. HOLLER & CO.,

Solingen, Prussia, exhibit a very handsome assortment of fine quality pocket knives and scissors, razors, hunting knives, etc. They also exhibit one large knife containing one hundred pieces.

R. & H. VORSTER,

Hagen in Westphalia, Prussia, show a case of

corn and cane knives, axes and hatchets, broad axes, mattocks, butcher and shoe knives, bill hooks, cast steel hoes, etc. These goods are well finished, and we notice many of the tools, particularly the axes, are made and finished precisely in accordance with our American patterns.

THE MERIDEN CUTLERY COMPANY,

No. 49 Chambers street, New York, exhibit, in two very handsome cases, a large variety of their patent ivory and real ivory handled table and dessert knives, carvers, &c. These goods are shown both in steel finish and with silver plated blades. They also show the rather popular styles of table knives, with solid steel handles, and full plated; handsome table and dessert knives, with pearl handles; nut picks, butter knives, &c. In rubber handled table cutlery, a leading specialty with this house, a handsome assortment of goods is exhibited. They warrant these handles not to be affected by hot water. Beside the goods above mentioned, they have on exhibition an assortment of the medium grades of table cutlery, with rosewood, ebony and bone handles, having handsome nickel bolsters. In a counter case they show a pair of carvers over six feet in length, handsome sets of pearl, ivory and patent ivory handled plated knives, carvers, &c., in cases, and some beautiful samples of carvers with carved ivory handles.

JOHN RUSSELL CUTLERY COMPANY,

The magnificent display of table cutlery shown by the John Russell Cutlery Co., Green River Works, Mass., is conspicuous, not only on account of the beautiful finish of the goods, the good taste exhibited in their arrangement, and the splendid cases which inclose them, but for completeness in the matter of assortment. It would be difficult to suggest how this exhibit could be improved. The goods of this company are shown in all the different grades, from the commonest scale tang table knife without bolster to the most costly and elaborate goods in ivory and pearl handles. In knives and forks with white bone handles and nickel bolsters a large assortment is shown, and it is pleasant to notice in this, as in nearly all the exhibits of American cutlery, that we have examined, the care of our manufacturers in the matter of detail. We refer particularly to the fittings of bolsters and scales, the finish of steel forks in the arches of the tines; from the cheapest grades to those goods which adorn the tables of the opulent, all bear the same evidence of neatness and accuracy. Beside the goods above mentioned we noticed complete assortments of table knives in ebony and cocco wood handles; ivory handled table and dessert knives, and carvers in great variety; every size of French cooks' knives; glaziers', vegetable and butchers' knives; palette knives, nut picks in silver and gold plated handles, the same in pearl and ivory, both steel finish and plated; cheese scoops, butter knives, butchers' and table steels, &c. They also show in great variety ivory and pearl handled table, dessert knives and carvers in handsome cases. There is nothing on exhibition that shows more clearly the wonderful growth of this industry in the United States than the display made by the John Russell Cutlery Company, and we are pleased to add that the goods are in our opinion fair samples from their regular stock.

THE D. R. BARTON TOOL COMPANY

make a characteristic display of their manufactures, at once varied, neat and good, and which, to the mechanic, is irresistibly attractive. The case in which the exhibits are shown is of black walnut, with heavy moldings, free from ornamentation except on the upper part, which is richly carved. At the center, and above the exhibits, there is a large portrait of the founder of the firm, the late D. R. Barton, and on each side are inscriptions giving the name and address of the firm, date of organization, trade-mark, etc. The space occupied covers an area of 128 square feet, and the exhibit is one of the most varied and extensive of its class. We are informed that the goods exhibited were taken from their usual stock, and are in every respect such as they ordinarily manufacture, not a single article being got up for the occasion. The exhibitors enter them for competition. To enumerate and describe the articles exhibited by this firm would require a description of almost every tool used by carpenters, coopers, shipbuilders, coach makers, &c. We may name a few articles, such as planes, grooving plows, boxwood, rosewood and ebony handles, molding tools of various kinds; broad axes, hand axes, hatchets, adzes, drawing knives, chisels, slicks and gouges, coopers' adzes, chamfer knives, spokeshaves, scrapers, caulking mallets, caulking irons, plane irons, and hammers of every description. They have also butchers' tools and edge tools for almost every conceivable purpose, and in great variety.

#### South American Trade.

The Philadelphia *North American* says: The visit of the Emperor of Brazil has excited new interest here in the political condition, the agriculture and commerce of Brazil and all South America. That portion of the continent is now more at peace and gives better promise of continuing peace and industry than at almost any former period. It has received very considerable accessions of population from Europe and the United States in the last ten years; and these accessions, distributed along both oceans and settled near the Caribbean coast, are giving material aid to the development of resources as varied, great and desirable as attract to Australia, Africa or Asia. English, French, German, Spanish and Italian commerce has sought the business that exists and enlarged it, so that regular steamship lines ply where recently sailing vessels were rare; so that a railway is crossing the Andes and another skirting the Atlantic; so that steam boats ply regularly far up the Amazon, and have explored

the Madeira and Negro and serve on the Parana; so that cultivation and civilization are extending rapidly and yielding the earnest of early and permanent profit.

One of the latest discoveries is that of the Putomayo River, an affluent of the Amazon, whose sources are very near those of the Magdalena, is navigable by steamboat for 1000 miles. It enters the Amazon 1700 miles from the sea, and boats that leave Para can penetrate the whole northern boundary of Ecuador by this new route, as they have skirted the southern and entered Peru by the Ucayali. The Putomayo is the stream by which the explorers on the Magdalena in search of a canal route to the Pacific thought the commerce between the Pacific and Caribbean Sea might be connected with Atlantic trade; and Mr. Simpson's report, verifying that supposition in some measure, shows the ease with which all the interior of the southern hemisphere can be opened. This Ecuadorian business is now neglected or drawn in small amounts to Venezuela and Colombia.

The specific fact runs with general reasons that urge early and earnest efforts by this country to gain more business in all parts of South America. Much has been done. Very recently American manufactures won numerous prizes at the exposition in Santiago; and, above the mere success, advertised the superiority of American skill and the advantages of American trade where this knowledge is most needed, and where its products will be most profitable. Peru and Chili and Brazil and the Argentine Confederation are annually ordering more manufactures hence in return for the coffee and quinine and hides and dyes and rich woods and various products taken. Their merchants find their way here, notwithstanding great facilities for reaching Europe; and it is only necessary that an earnest effort should be made to establish regular intercourse in order to enlarge the trade we have and create new branches, and make all the development there tributary to our welfare. The exhibits by Brazil and Peru and Colombia and other South American States at the Centennial, incomplete as they are, must convince every beholder that the acquisition of this trade, even as it is, is a prime object of national solicitude. Augmented by consideration of the exports we now make and may make against European competition, and of the increase South American trade is certain to attain, there should be no delay in striking boldly and resolutely for an advantage of the first order.

**A Romance of the Signal Service Bureau.**—A correspondent at Washington tells the following veracious anecdote: I heard a couple of days ago a hitherto unpublished romance connected with the life of one of the most prominent officials of the Signal Service Bureau. He was, my informant states, once engaged to be married to a lovely, charming and wealthy girl. The eve of the wedding had dawned—if an eve can dawn—and they were

occupying the same rocking chair and talking as intently as only lovers can talk, when the fair one said: "Albert, there is one thing I wish you to do when we are married." "Name it," he replied, making her feel that her corsets were a mile too large for her. "That is, to have no rain on Mondays, because, you know, darling, that Monday is washing day, and if the things are not washed and dried then, the week's work is so fearfully put back. You will, won't you, my own?" The young man's heart was torn, but he replied: "Maud, dearest, my duty to my bleeding country demands imperatively that I shall whoop her up the precise sort of weather that heaven will probably send impartially during the next twenty-four hours upon the just and the unjust, without regard to age, sex or previous condition of servitude. If an area of barometric disturbance exists in the Middle States on Monday, how can I consistently with my duty declare that the probabilities favor clear weather with light winds from the southeast? No, angel; ask me anything but that. I could not love thee, dear, so darn much, loved I not honor more." "Then you do not love me," she sobbed, bursting into tears. The reader will readily understand how they progressed to a quarrel and parted enemies. She returned his presents, and is now lecturing on Woman's Rights, and he is a confirmed misogynist, and sits up all Sunday night at the Signal Service office, with fiendish glee making out bulletins for Monday, announcing falling barometers, atmospheric disturbances, heavy rains, showery weather, and so on.

#### EUREKA LATHE, \$9.00.



WITH FOOT POWER, \$15.00.

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Manufacturers of  
**HARDWARE & HOUSE-FURNISHING GOODS.**

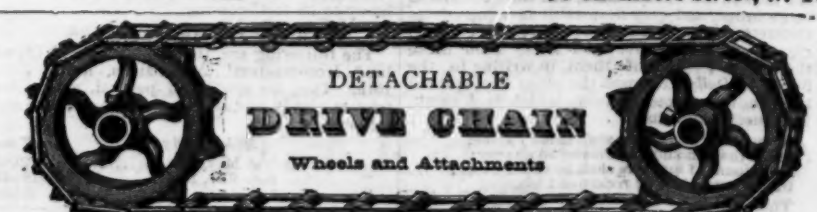
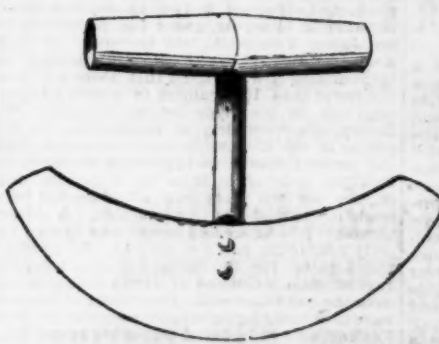
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Screw Drivers of all varieties, Box Scrapers, Box Openers, Garden Hoes, Garden Trimmers, Border Knives, Mining Knives, Fish Turners, Butter Knives, Cake Turners, Cleavers, Hammers, Carpet Stretchers, Tack Claws, Marblers' & A's, Carpenters' A's, Belt A's, Ice Axes, Carriage Jacks, Nail Sets, Bush Hoes, Ice Axes, Ice Tongs, Patent House Traps, Vegetable Slicers, Bit Braces, Butts and Spiral Springs, Ferrules, Ham Trays, Ham Stringers, Oyster Knives, Cold Chisels, Handles, Solid and Prick Patches, Box Hooks, Bow Pins, Bull King Needles, But Rings, Bill Hooks, Blind Adzes, Curving Irons (Wrought), Cork Screws, Card Leadens, Corn Hooks, Door Springs, Knives (Kitchen), Saw Sets (Bar's Patent), Saw Sets (Aiken's Patent), Saw Sets (Improved Bench), Spoons (Table and Tea), Washers (Tin and Iron), Knob Rings a specialty, and **EMPIRE MACHINERY SCREW DRIVERS**, Catalogues and Circulars sent on application.

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These recent improvements in combination with the nut inside the ferrule firmly screwed up flush, against square, solid bearings (that cannot be forced out of place by use), verifies our claim that we are manufacturing the strongest Wrench in the market.

We would also call attention to the fact, that in 1869 we made several important improvements (secured by patents), on the old wrench previously manufactured by L. & A. G. Coes which were at once closely imitated and sold as the *Genuine Wrench* by certain parties who seem to rely upon our improvements to keep up their reputation as manufacturers, and although the fact of their imitating our goods may be good evidence that we manufacture a superior Wrench, we wish the trade *know* not to be deceived on the question of originality. Trusting the trade will fully appreciate our recent efforts, both in improvements on the Wrench and in the adoption of a Trade Mark, we would caution them against imitations. None genuine unless stamped.

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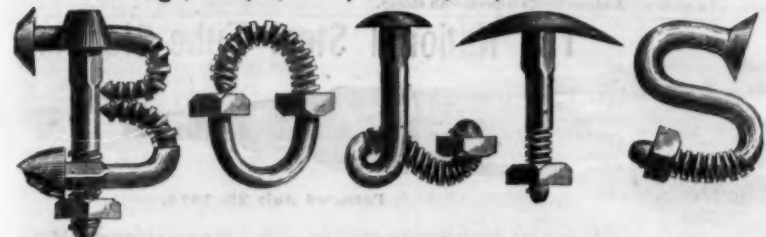
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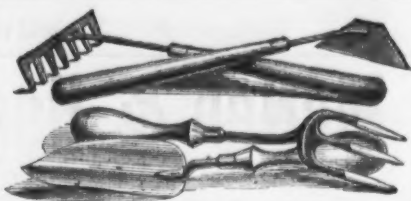
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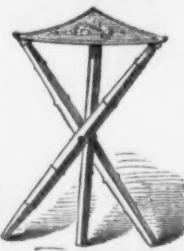


All the different styles used by the manufacturers of the finest Carriages. Every Bolt warranted true to size and fit. Illustrated Price Lists mailed on application. Our facilities are unsurpassed for the manufacture of Machine Bolts and Conch Screws. Correspondence from Car, Bridge and Machinery Builders solicited.



This set of GARDEN TOOLS, is put up in a nice paper box, and is superior to any other in the market. The tools are made of the best quality of Steel, highly polished, and of malleable iron polished or painted, with birch handles. We will make it an object for every dealer to handle them.

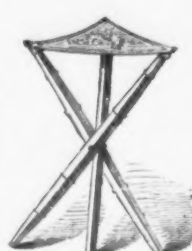
PRICE \$15, PER DOZEN SETS.



## CENTENNIAL CHAIR.

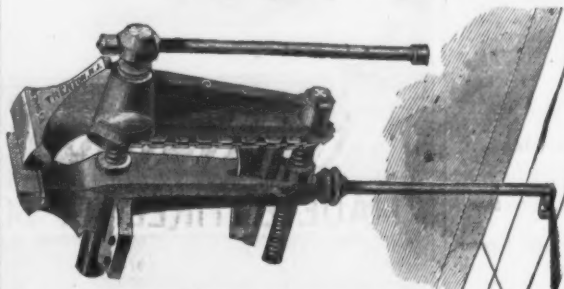
This Chair is made of the best second growth White Ash, finished on the wood, with Brussels Carpet Seat. It shuts up to the size of a single chair post, and weighs only one pound. Every person who forgets to take one with him when he goes to the Centennial, will be sorry when he gets there, as no chairs are provided for visitors, and they get very tired. Every store in the land can sell a few of them at a profit. They are a very popular article here.

PRICE, \$12 PER DOZEN.



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### The New Double Screw Parallel "Leg" Vise.



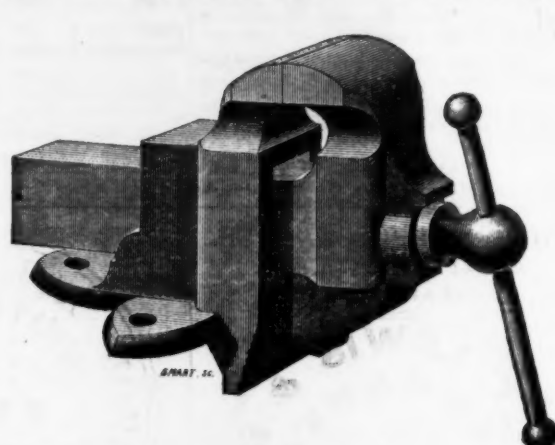
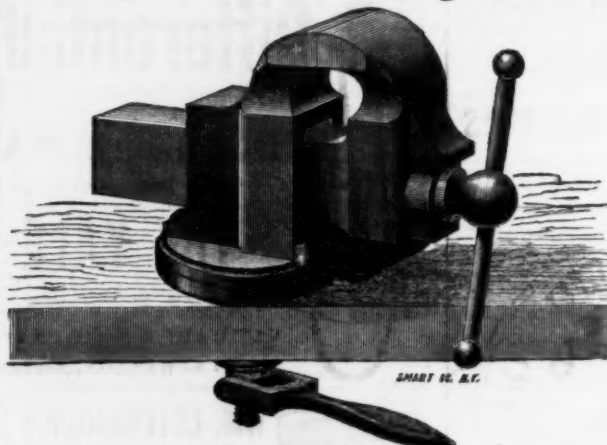
No.	Jaws	5 1/2 in. x 3/4 in. Screws	1/2 in. diameter.	Lever	9 in. long.	Opens	4 1/2 in.		
1.	4 1/2 in. x 1 in.	1 1/2 in.	1 1/2 in.	15 in.	"	5 1/2 in.	"	12 00	
2.	5 1/2 in. x 1 1/4 in.	1 3/4 in.	1 3/4 in.	16 in.	"	6 1/2 in.	"	17 00	
3.	6 1/2 in. x 1 3/4 in.	1 3/4 in.	1 3/4 in.	19 in.	"	7 1/2 in.	"	22 00	
4.	7 1/2 in. x 1 3/4 in.	1 3/4 in.	1 3/4 in.	24 in.	"	9 in.	"	30 00	
5.	8 1/2 in. x 1 3/4 in.	1 3/4 in.	1 3/4 in.	25 in.	"	10 in.	"	34 00	

All sizes of these Vises furnished with Swivel Attachment, at an additional cost of \$1 to \$2. Sold at the General Agencies.

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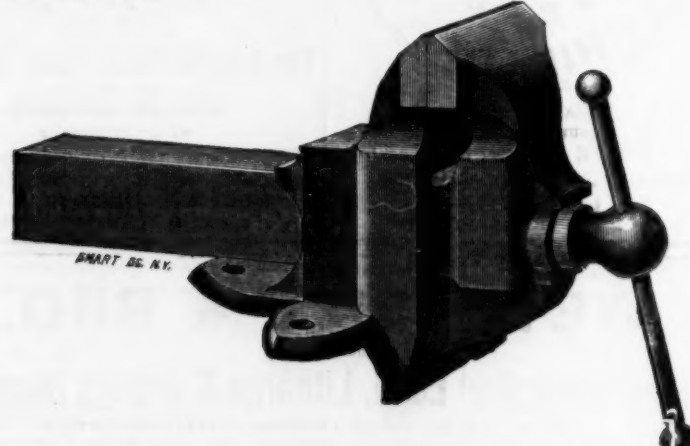
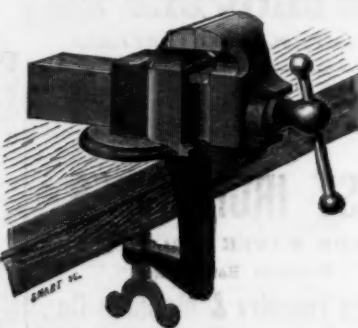
## Simpson's Adjustable Parallel Vises.



The Jaws can be instantly opened or closed the full length, by one movement of the hand, without the use of the screw.

They combine the QUICK ADJUSTMENT with all the advantages of the best Screw Vises, holding the work with as slight or firm a grip as may be desired, without any liability to jar or work loose, as is the case with other adjustable vises.

The Screw being used merely to give the grip, they will outwear any Vises in market.



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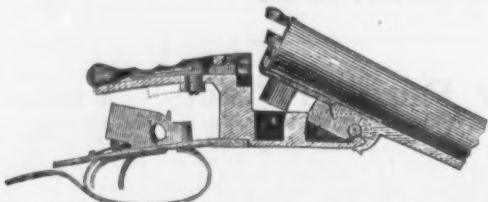
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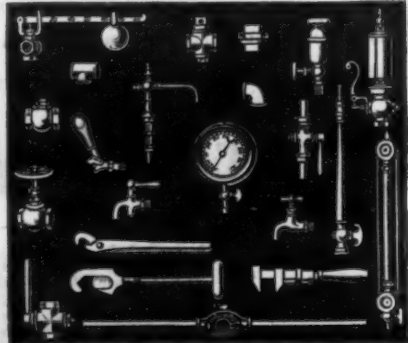
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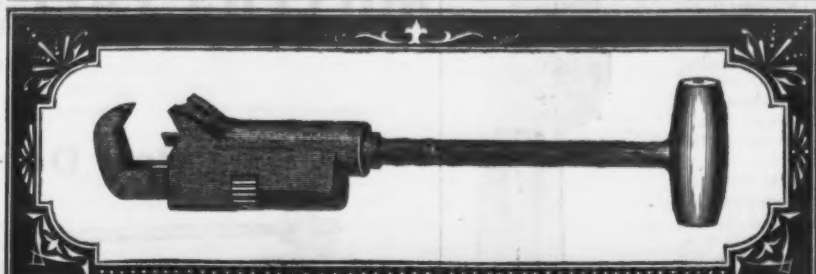
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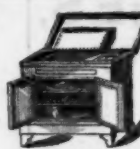
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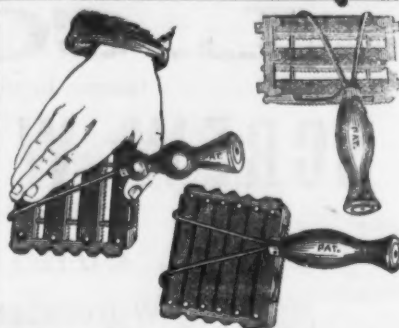
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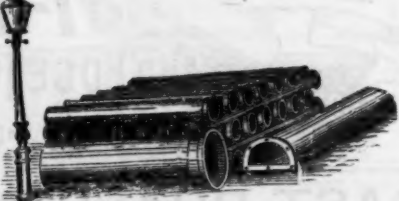


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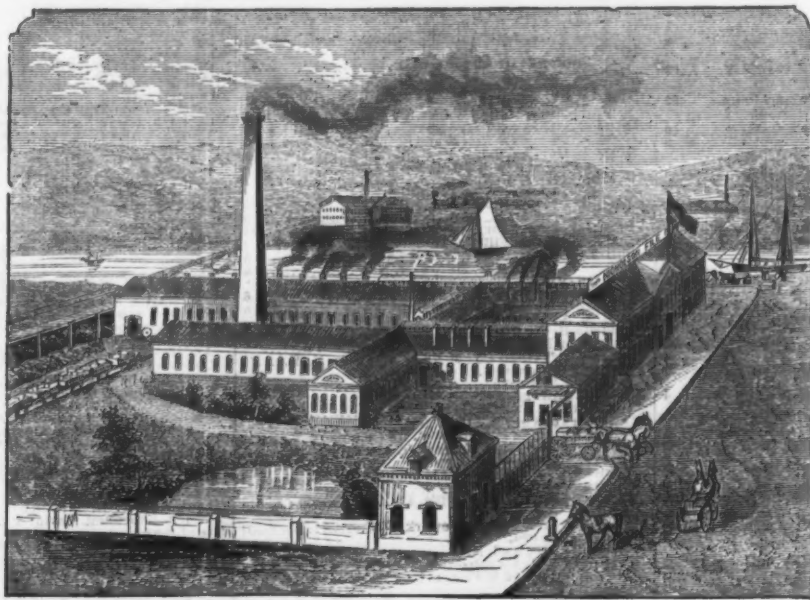
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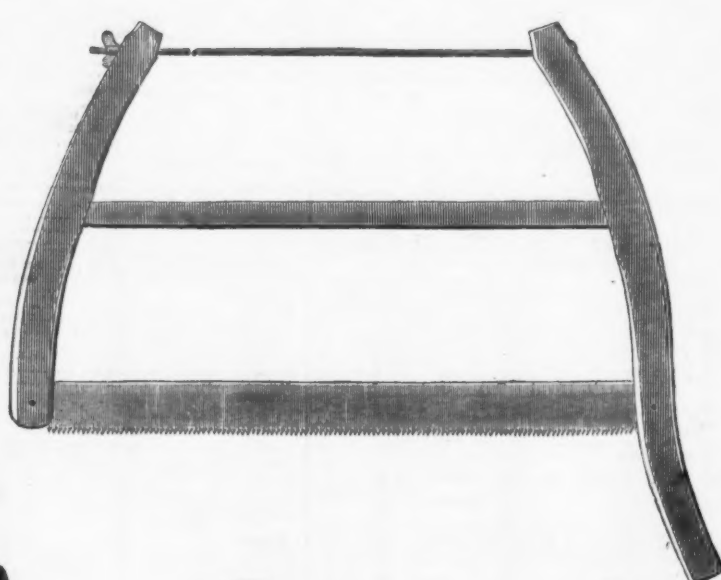
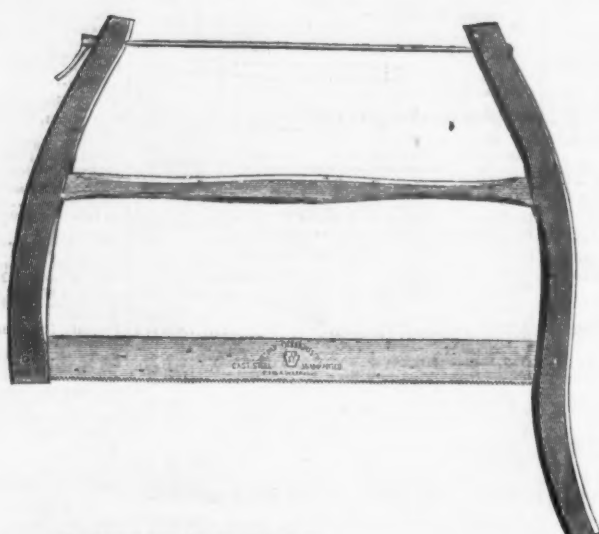
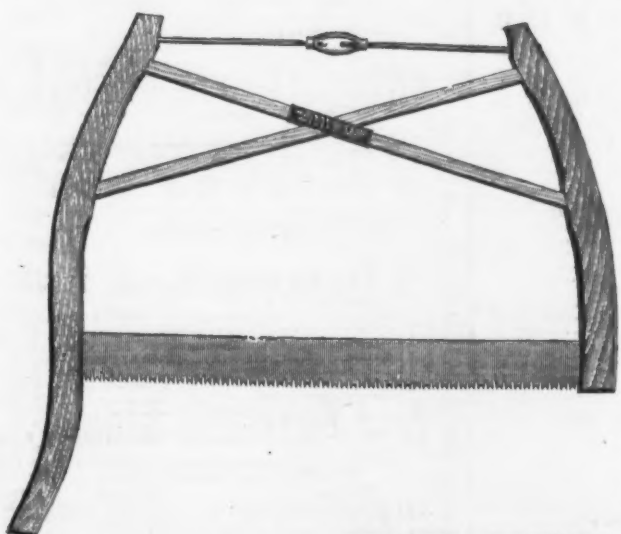
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119 SOUTH FOURTH ST., PHILADELPHIA,  
AND MARBLE BUILDINGS

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H. HOWSON, Solicitor of Patents. C. HOWSON, Attorney at Law.  
Communications should be addressed to the  
PRINCIPAL OFFICES, PHILADELPHIA.

# Keystone Saw, Tool, Steel and File Works.

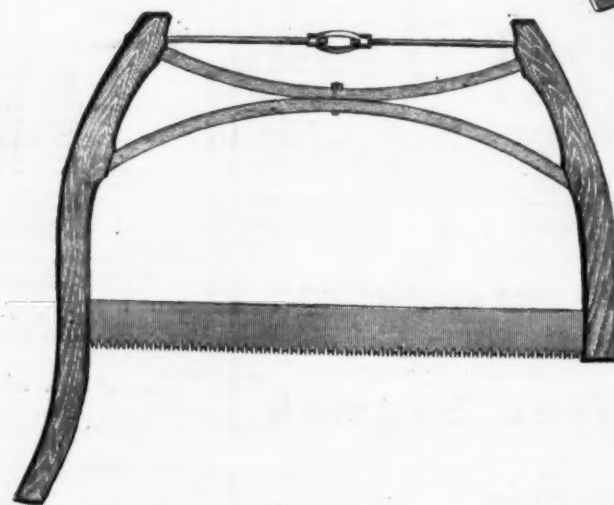
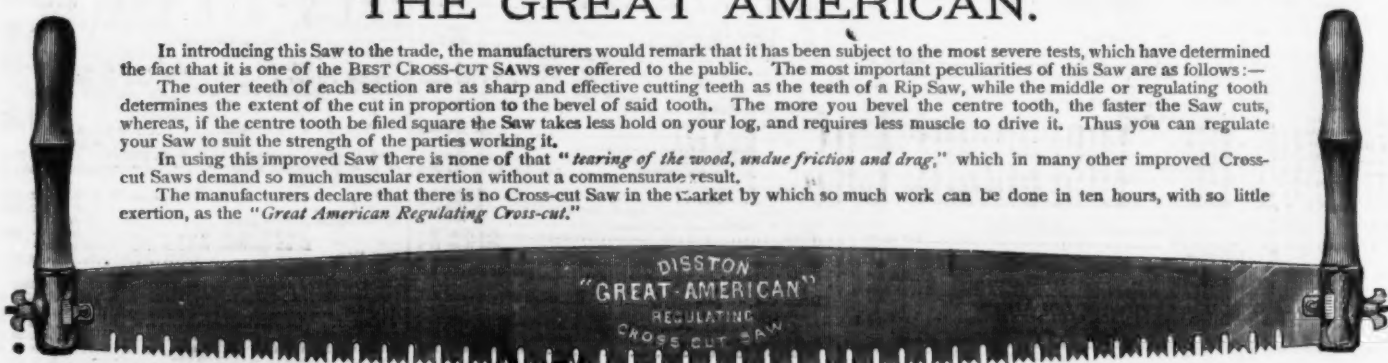
Front and Laurel Streets, Philadelphia.

## HENRY DISSTON & SONS, IMPROVED CROSS-CUT AND WOOD SAWS.



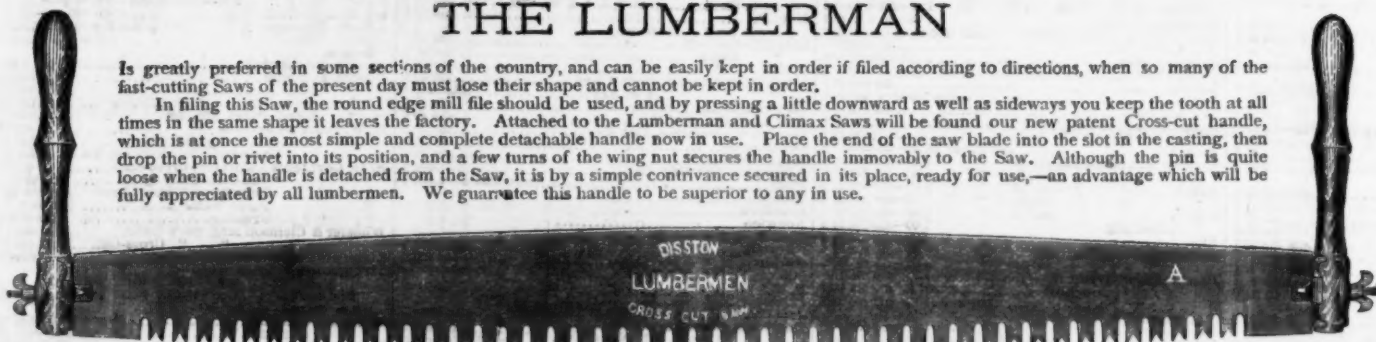
### THE GREAT AMERICAN.

In introducing this Saw to the trade, the manufacturers would remark that it has been subject to the most severe tests, which have determined the fact that it is one of the BEST CROSS-CUT SAWS ever offered to the public. The most important peculiarities of this Saw are as follows:—  
The outer teeth of each section are as sharp and effective cutting teeth as the teeth of a Rip Saw, while the middle or regulating tooth determines the extent of the cut in proportion to the bevel of said tooth. The more you bevel the centre tooth, the faster the Saw cuts, whereas, if the centre tooth be filed square the Saw takes less hold on your log, and requires less muscle to drive it. Thus you can regulate your Saw to suit the strength of the parties working it.  
In using this improved Saw there is none of that "tearing of the wood, undue friction and drag," which in many other improved Cross-cut Saws demand so much muscular exertion without a commensurate result.  
The manufacturers declare that there is no Cross-cut Saw in the market by which so much work can be done in ten hours, with so little exertion, as the "Great American Regulating Cross-cut."



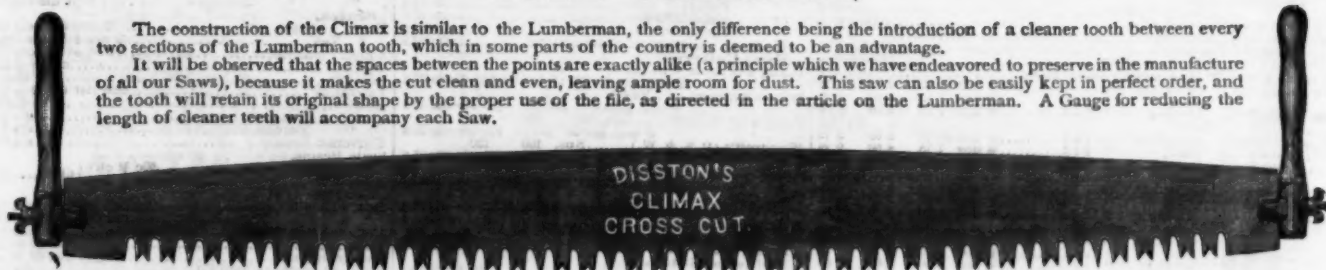
### THE LUMBERMAN

Is greatly preferred in some sections of the country, and can be easily kept in order if filed according to directions, when so many of the fast-cutting Saws of the present day must lose their shape and cannot be kept in order.  
In filing this Saw, the round edge mill file should be used, and by pressing a little downward as well as sideways you keep the tooth at all times in the same shape it leaves the factory. Attached to the Lumberman and Climax Saws will be found our new patent Cross-cut handle, which is at once the most simple and complete detachable handle now in use. Place the end of the saw blade into the slot in the casting, then drop the pin or rivet into its position, and a few turns of the wing nut secures the handle immovably to the Saw. Although the pin is quite loose when the handle is detached from the Saw, it is by a simple contrivance secured in its place, ready for use,—an advantage which will be fully appreciated by all lumbermen. We guarantee this handle to be superior to any in use.



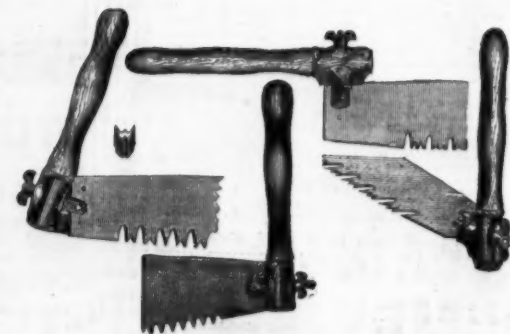
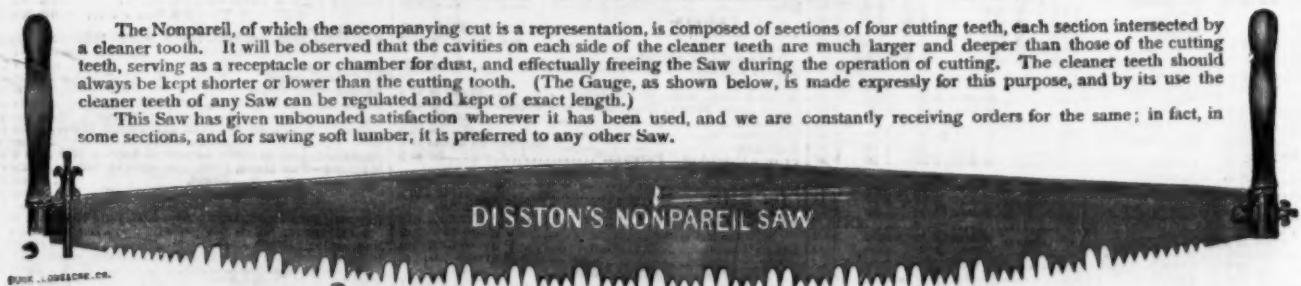
### THE CLIMAX.

The construction of the Climax is similar to the Lumberman, the only difference being the introduction of a cleaner tooth between every two sections of the Lumberman tooth, which in some parts of the country is deemed to be an advantage.  
It will be observed that the spaces between the points are exactly alike (a principle which we have endeavored to preserve in the manufacture of all our Saws), because it makes the cut clean and even, leaving ample room for dust. This saw can also be easily kept in perfect order, and the tooth will retain its original shape by the proper use of the file, as directed in the article on the Lumberman. A Gauge for reducing the length of cleaner teeth will accompany each Saw.



### THE NONPAREIL.

The Nonpareil, of which the accompanying cut is a representation, is composed of sections of four cutting teeth, each section intersected by a cleaner tooth. It will be observed that the cavities on each side of the cleaner teeth are much larger and deeper than those of the cutting teeth, serving as a receptacle or chamber for dust, and effectually freeing the Saw during the operation of cutting. The cleaner teeth should always be kept shorter or lower than the cutting tooth. (The Gauge, as shown below, is made expressly for this purpose, and by its use the cleaner teeth of any Saw can be regulated and kept of exact length.)  
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15 x 22 to 24 x 30.....	12-75	9-75	8-75	7-75	7-25
15 x 36 to 24 x 30.....	12-25	10-75	9-00		
16 x 28 to 24 x 36.....	13-00	11-50	9-75		
28 x 36 to 24 x 36.....	14-50	12-25	10-75		
26 x 46 to 30 x 50.....	15-00	14-10	11-25		
30 x 52 to 30 x 54.....	16-00	14-50	12-00		
30 x 56 to 34 x 60.....	17-25	15-50	13-50		
34 x 58 to 34 x 60.....	18-25	17-25	15-00		
36 x 60 to 40 x 60.....	20-75	18-75	17-25		

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6 x 8 to 10 x 15.....	7-50	6-75	6-25	5-75
11 x 14 to 16 x 24.....	8-75	7-75	7-25	6-75
15 x 22 to 24 x 30.....	12-25	10-75	9-00	8-25
15 x 36 to 24 x 30.....	12-25	10-75	9-00	8-25
16 x 28 to 24 x 36.....	13-00	11-50	9-75	8-75
28 x 36 to 24 x 36.....	14-50	12-25	10-75	9-75
26 x 46 to 30 x 50.....	15-00	14-10	11-25	10-50
30 x 52 to 30 x 54.....	16-00	14-50	12-00	11-00
30 x 56 to 34 x 60.....	17-25	15-50	13-50	12-50
34 x 58 to 34 x 60.....	18-25	17-25	15-00	14-00
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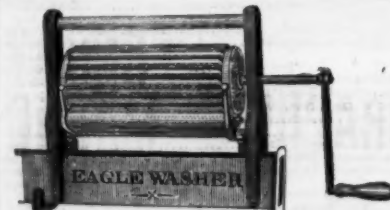
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W. & S. Butcher's Files, Edge Tools and Razors, the largest stock in the United States.

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These Wrenches are made from the best of Wrought Iron, with Steel Head and Jaw, Case-Jardened throughout, and not only combine all of the superior qualities of our cylinder or Gas Pipe Wrenches, but also all requisite combinations of a regular Nut Wrench, thus making a Combination which has no equal. For Circulars and Price List, address,

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**Keystone Pressure Blowers.**

Anti-friction and noiseless; maximum blast and minimum power; all sizes for

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Made on same principle.

For Ventilating Mines, Buildings, etc.; Removing Dust, Shavings, etc.; Drying Wool, Lumber, etc. Every Blower Guaranteed. Send for circular, or call and see them in operation.

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Also, sole manufacturers of the celebrated KEYSTONE PORTABLE FORGES, for all classes of work, from the lightest to the heaviest.

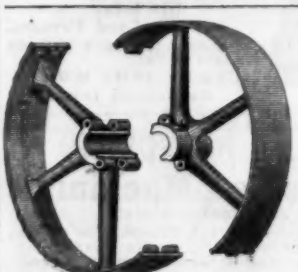
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Butchers' Cleavers,  
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Axes and Hatchets,  
Grub Hoes and Mattocks,  
Mill Picks,  
Box Chisels and Scrapers,

Ring Bush Hooks,  
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Coopers' and Turpentine Tools.

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**MARTIN DOSCHER, Agent, 96 Chambers Street, N. Y.**



**Split Pulleys & Split Collars**

Of same price, strength and appearance as WHOLE PULLEYS and WHOLE COLLARS.

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WOODEN TOOTH



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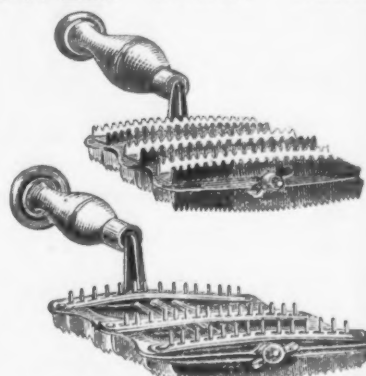
The Best yet Invented.

**CHEAP AND DURABLE**  
Is Pleasant to the Horse, and does not injure the Brush.

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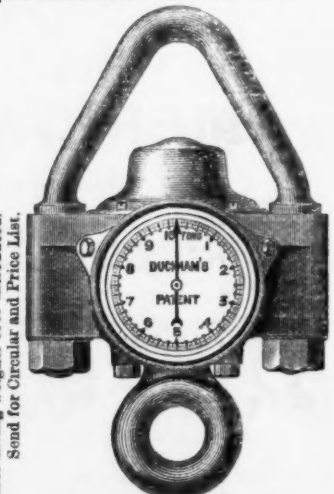
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We call the attention of Hardware Dealers to our Double Curry Comb, comprising a fine and coarse side; or virtually two combs in one. It is useful, durable and novel, and needs no argument to convince any one of its practicability. It sells on sight, and is bound to supersede all other combs. We want one reliable dealer in each state or large city to handle it. Correspondence solicited.

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Suspended Self-Indicating  
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Capacities from 1 to 100 tons.



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MANUFACTURER,  
Hydraulic Presses, Accumulators, &c.  
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We invite attention to the superior construction of this chuck. Its working parts are absolutely protected from dirt and chips. It is strong, compact and durable, and will hold the greatest variety of work, as the jaws are adjustable with a range the full diameter of the chuck. For Price List address,

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FOR  
AMERICAN COFFEE, DRUG AND SPICE MILLS.

Measuring Faucets  
BUNG-HOLE BORERS,  
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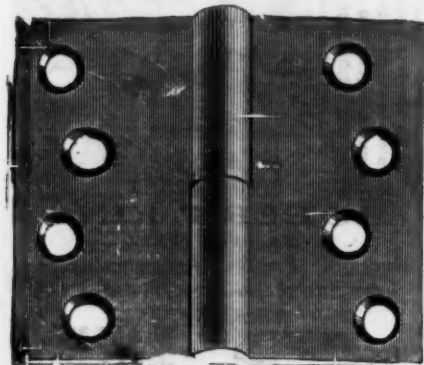
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SMALL CASTINGS  
Made to order.

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FILES and HORSE RASPS.  
Rough & Ready  
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CLIPPER SCYTHES,  
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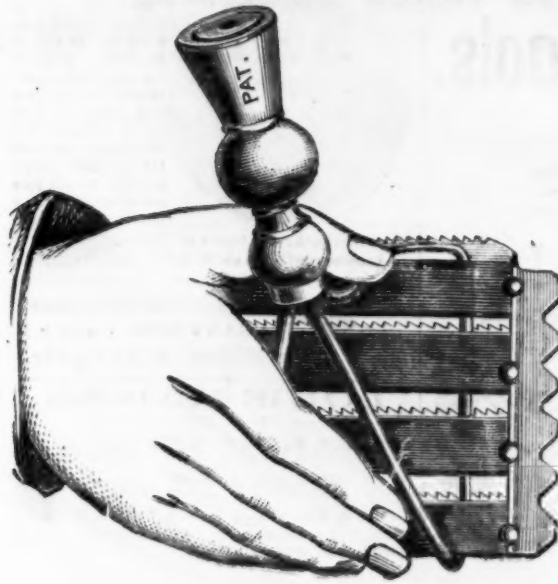
All Wrought Iron,  
The BEST,  
STRONGEST and  
Most DURABLE  
COMB Ever Made.

Patented: May 5, 1874  
Nov. 17, 1874  
Aug. 24, 1875

FOR SALE BY

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Rear of 51 and 53 North Third Street,  
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It is the most convenient, durable, safe and reliable Snap  
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It has a brass coil spring that is four times as long as  
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It is enclosed in the barrel back of the bolt, making  
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without danger of having the parts broken or disarranged.  
We manufacture all sizes of Harness Snaps and Round  
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Send for price list and circulars.

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Manufacturers of

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Our goods have been very  
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shown in the cut, which makes  
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## A. G. COES'

NEW PATENT

## FERRULE

Which cannot be forced back  
into the handle.  
Our goods are manufac-  
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ruary 7, 1860, (re-issued June  
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either will be vigorously pro-  
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We call particular attention to  
our new Patent Ferrule, with its  
Supporting Nut (shown in section  
in the above cut), which makes  
the strongest Ferrule fastening  
known.

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"DRAW CUT"  
BUTCHERS' MACHINES  
Choppers, Hand and Power.  
Stuffers,  
Lard Presses.

Warranted thoroughly made and  
the BEST IN USE.  
MURRAY IRON WORKS  
Burlington, Iowa.

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And manufacturers of  
Lathes, Shapers, Slotters, Planers, Gear Cutters,  
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37, 39 & 51 Nassau Avenue,  
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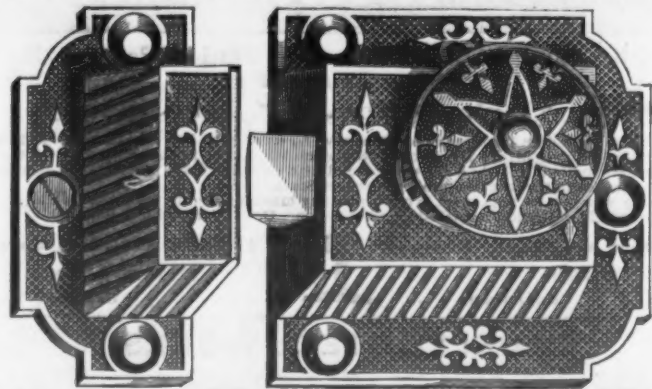
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Japped, Brass, Plated, Enameled and Bronze Metal  
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Door Bolts, Sash Fasteners, Drawer Pulls, Store Door Handles, &c.,  
IN GREAT VARIETY.

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## AUGERS.

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Bonney's Spoke Trimmers

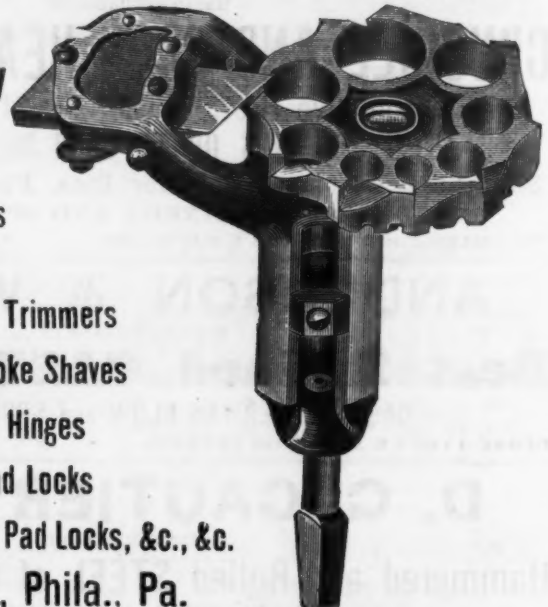
Double Edge Snake Shaves

Adjustable Gate Hinges

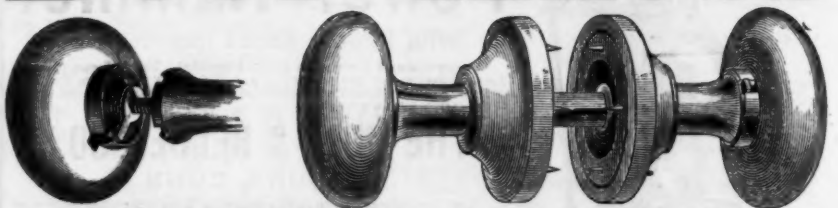
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Flat Key Brass and Iron Pad Locks, &c., &c.

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THE WHIPPLE DOOR KNOB  
Is the only perfect Door Knob Attachment ever invented.

AWARDED A BRONZE MEDAL

At the American Institute Fair, in New York, for 1874.

NO SCREWS USED IN NECK OR ROSES.

Adjusts Perfectly to Doors of Different Thicknesses

WITHOUT THE USE OF RINGS.

The attention of Architects, Builders and Carpenters is specially desired. Circu-  
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## SOLID BOX VISES.

With or without Convex and Concave Washers.

Jackscrews, Braces, Coffee Mills, Turning Lathes, Clamp  
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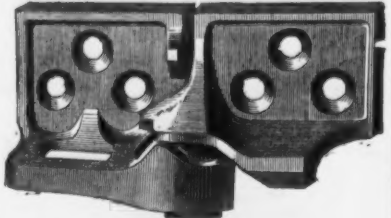


SEATTLE, BIRGE & CO., Sole Western Agents, 317-23015, 407

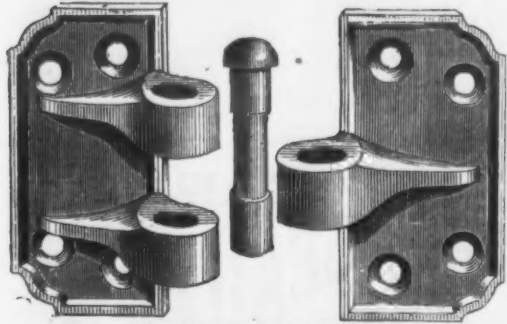
# CLARK & CO., BUILDERS' HARDWARE. BUFFALO, N. Y.



Design Patented Jan. 11th, 1876.



NEW PATENT, No. 1 Hinge.



No. 1 Upper Gate Hinge.

Send for Illustrated Catalogue and Price List.



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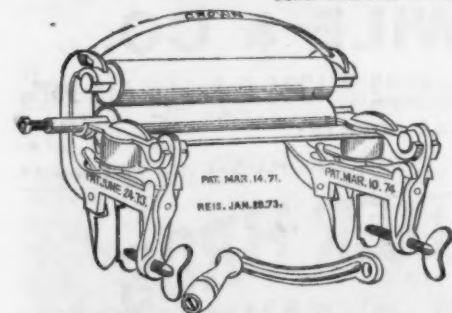
Patented September 3, 1867, February 6 and 18, 1872.

## THE IDENTICAL PROCESS OF HAND-CUTTING FILES APPLIED TO MACHINERY.

No Mistake about it this time.

The owners of these patents desire to sell them or to form companies to manufacture Files, File Blanks and File Handles under the Royalty System. Address, A. WEED &amp; CO., 355 Atlantic Ave., Boston.

## The American Machine Co., Manufacturers of the celebrated



## CROWN WRINGERS and CROWN FLUTERS

The most popular in the market.

Office, 430 Walnut Street, Philadelphia, Pa.

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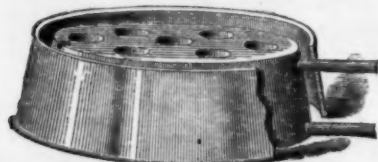
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Suitable for all purposes, for Cooking, Baking and Ironing.

NON-EXPLOSIVE.

Centennial Water Heater.



Patented June 13, 1876.

The most practical invention for heating steam tables, wash boilers, bath tubs, &amp;c. Will be supplied with Leland's Pat. Couplings.

DEAR SIR: We beg to inform you that we are the Sole Patentee and Proprietors of the Patent Oil Cook Stove called the SUMMER QUEEN, and will protect you in any sales you may be pleased to make for us against the threats, notices or molestation of any persons whatsoever.

Yours, truly,

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## HAMMERED, Hammer Pointed, Polished & Blued HORSE NAILS,

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Recommended by over 20,000 Horse Shoers.

All nails made from best NORWAY IRON, and warranted perfect and ready for driving. Orders filled promptly and at lowest rates by

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Kensington, PHILAD'A  
BUILDERS OF  
STATIONARY & MARINE  
ENGINES, BOILERS  
SHAFTING, GEARING,  
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MILL WORK  
GENERALLY.  
Special Machinery  
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Vertical and Horizontal Engines, of New and Heavy Designs, from 2 to 100 H. P. on hand, or in process of erection.

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Visitors invited to inspect our improved method of starting engines.

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Manufacturers of the following Patented Articles of  
**MALLEABLE IRON:**  
Hammer's Adjustable Clamps.  
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For Sale by all the principal Hardware Dealers.  
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Of superior Quality made to order.

Two First Premiums awarded by Franklin Institute Exhibition of 1874.  
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Manufacturers of Latest Improved Machine Tools, Rotary Shapers, two size, Iron Planers, all sizes, Horizontal Drill Attachments, for upright power drills, Self-feeding Portable Drills, hand or power, Expansion Boring Bars, all sizes, Universal Slide Rest, for taper work, Twist Drill Sharpening Machines, automatic and adjustable in every direction, Noiseless Friction Gears, for transmitting up to thirty horse-power. Send for Descriptive Circulars.

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FOR WORKING SHEET METALS, &c.  
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USE THE BEST.

THE BEST IS ALWAYS  
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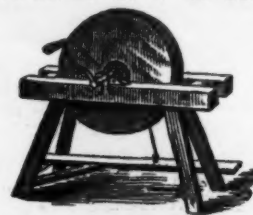
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Manufacturers of

## SCYTHE STONES.

"Star," "Diamond,"  
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"Manchester," "Indian Pond."  
Price list on application.

## BRADY MFG. CO.,

Manufacturers of

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Keep constantly on hand everything pertaining to

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Automatic Knife Grinders.

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Upon which to run the same, of all kinds.

EMERY  
Emery Cloth, TRADE MARK DIAMOND  
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For particulars, address,  
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And Shaped Diamond Carbon Points, indispensable  
for Turning Emery Wheels, Grindstones, also True-  
ing up hardened Steel and Paper Calendar Rollers,  
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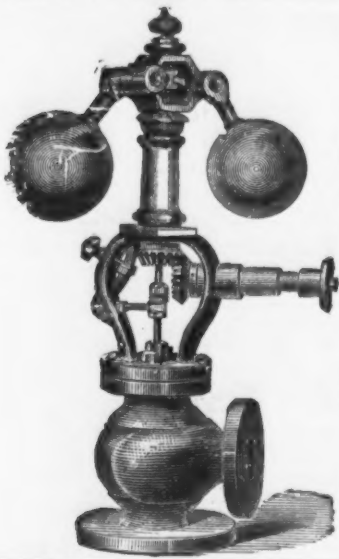
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Exclusive manufacturers of the Renowned

## Synovial Lubricating OILS.

The most Durable, Reliable & Eco-  
nomical Lubricant in existence;  
applicable to every grade of machinery. Send for Cir-  
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## TO ALL WHO USE STEAM-POWER!

We will put our Governor on any Engine, and guarantee it to prove itself superior to all others. If, after a fair trial, it does not, we will take it off at our own expense.

**Shive Governor Co**  
BETHLEHEM, PA.

SHIVE'S PATENT WATCHMAN'S  
CLOCK AND DETECTOR,

AND  
**Buoy's Patent Counter Scale,**  
No Nest of Weights.

Circulars sent free

## THE JUDSON GOVERNOR.

It is a common method to advertise Governors without cost, unless satisfactory to the customer, and then charge High Prices for doing what any good Governor will do. Various Governors inferior to the "Judson" are sold in this way, operating well enough for three months, to insure collection of the pay, but becoming useless after a year's wear—their construction lacking durability. The Judson Governor is guaranteed to be not only the best Regulator of Steam Engines, but also the most durable Governor made. Parties in buying other Governors should stipulate that their durability be guaranteed, and should also take care that they do not, for much inferior Governors, pay higher prices than those shown in the accompanying list. We guarantee the Judson Governor will do all any other Governor can do, and in Accuracy and Durability—the main essentials—we guarantee it shall do more.

## Reduced Price List, JANUARY 25th, 1876.

For dimensions of Governor, see Illustrated Price List.



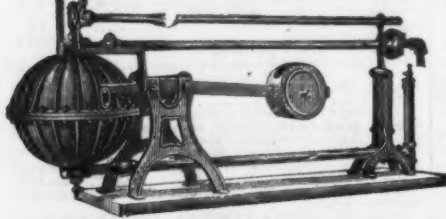
THE JUDSON PATENT  
Improved Steam Governor.

Size, Inch.	Pair.	Bright Fin- ished.	Extra for Lever.	Stop Valve.
1/2	\$17.00	\$19.00	\$1.00	..
3/4	19.00	21.00	1.00	..
1	21.00	24.00	3.00	\$5.00
1 1/4	25.00	28.00	3.25	6.00
1 1/2	29.00	33.00	3.50	8.00
2	35.00	40.00	4.75	10.00
2 1/4	42.00	48.00	5.25	14.00
2 1/2	45.00	51.00	5.50	15.00
2 3/4	49.00	56.00	5.75	17.00
3	55.00	63.00	6.25	20.00
3 1/4	64.00	73.00	6.50	25.00
3 1/2	74.00	84.00	7.00	30.00
4	86.00	97.00	7.50	36.00
5	94.00	106.00	8.00	42.00
5 1/2	119.00	135.00	8.50	48.00
6	125.00	138.00	9.00	54.00
7	150.00	165.00	9.00	68.00
8	185.00	202.00	9.00	80.00
9	305.00	325.00	10.00	..

No Charge for Boxing & Cartage.

JUNIUS JUDSON & SON, Rochester, N. Y.

## The Albany Steam Trap.



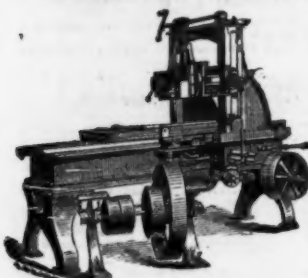
This Trap automatically drains the water of condensation from Heating Coils, and returns the same to the Boiler whether the Coils are above or below the water level in Boiler, thus doing away with pumps and other mechanical devices for such purposes. Apply to

Albany Steam Trap Company,  
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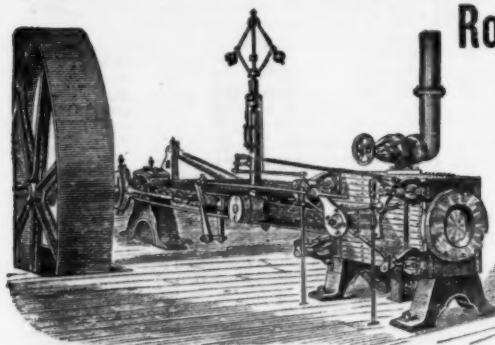
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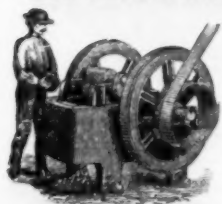
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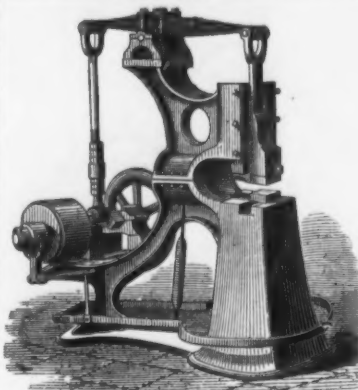
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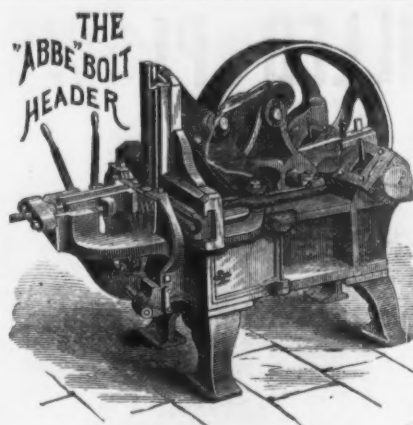
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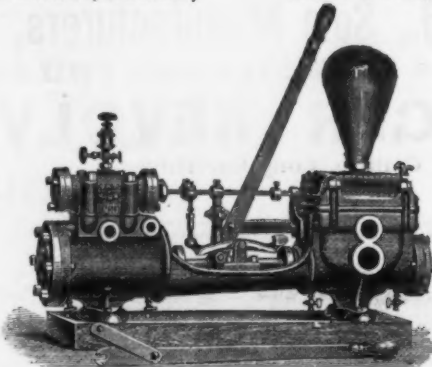
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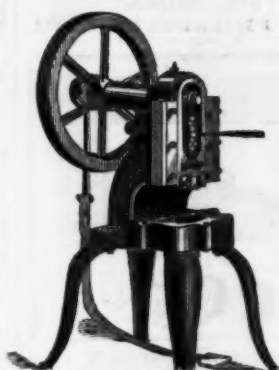


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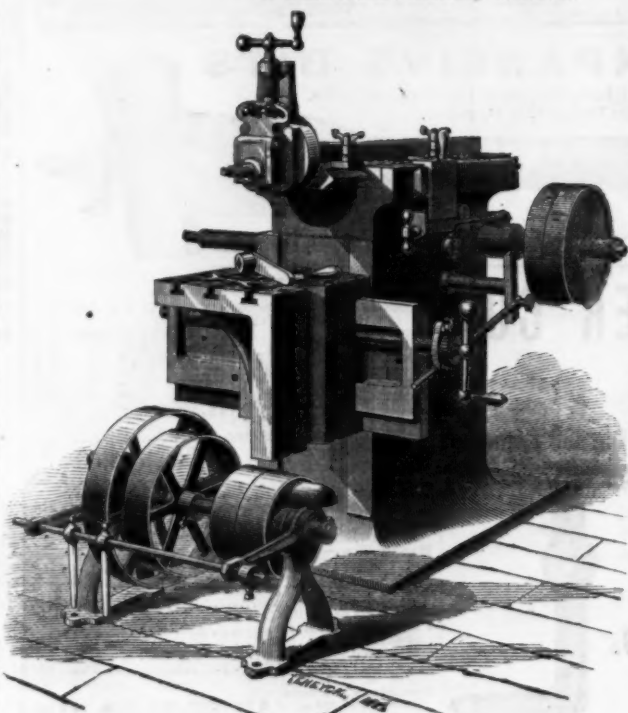
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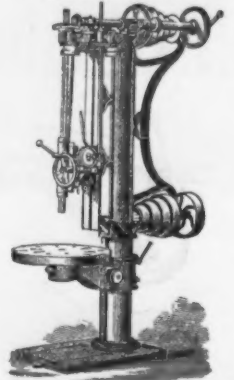
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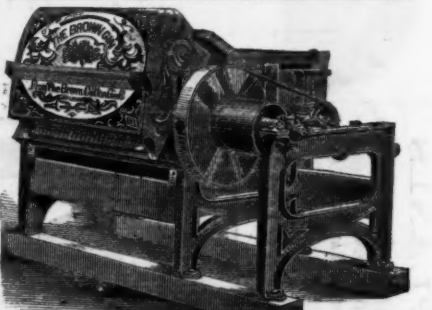
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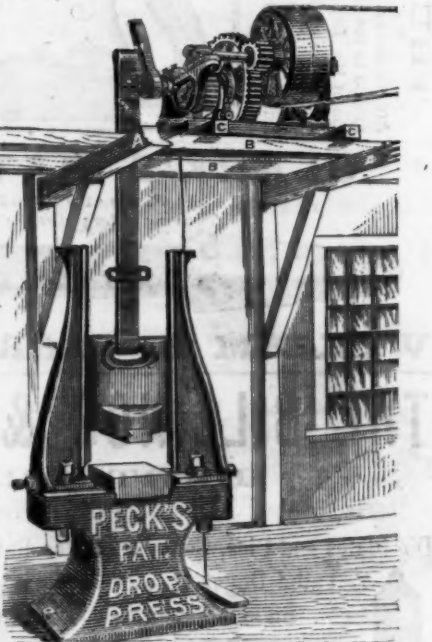


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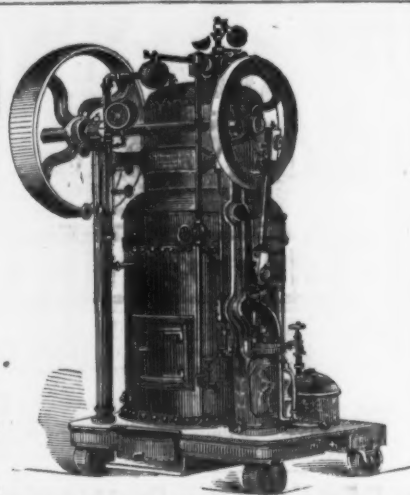
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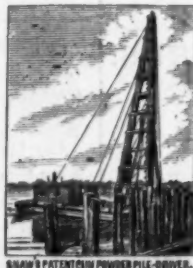
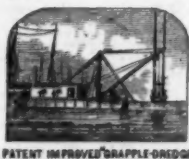
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REPORT OF JUDGES

In Department V, Group 3, at the 44th  
Exhibition of the

AMERICAN INSTITUTE,  
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No. 318, Drawing, Drop &  
Punching Presses.

THE STILES & PARKER PRESS CO.,  
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The machinery exhibited by these makers is of a  
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justable to an inclination for discharging work left  
above the die, there are exhibited by these a com-  
bined punch and shears, a drawing or blanking press,  
and a drop.  
In all these there is shown the highest mechanical  
culture, applied to meet every practical requirement,  
to avoid every practical difficulty, and to enlarge the  
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which are at once simple, elegant, and effective.  
Your committee would unhesitatingly recommend  
for this exhibition the "Medal of Progress," but  
and such award debared by the rules of the Institute,  
forbidding such award unless a Silver Medal has  
been previously awarded. We, therefore, respect-  
fully recommend the award of a Silver Medal.  
Silver Medal Awarded.  
A true copy from the Report on file.  
JOHN W. CHAMBERS, Sec'y.



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Highest Premium awarded by  
Franklin Institute, 1874,  
For Simplicity, Economy of  
Construction & Efficiency.

An absolutely Durable, Cheap, Efficient and Eco-  
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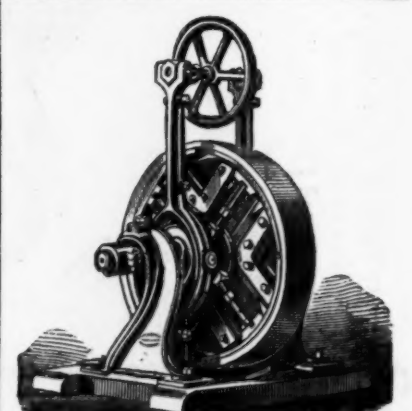
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EUREKA SAFETY POWER!



Practically impossible to  
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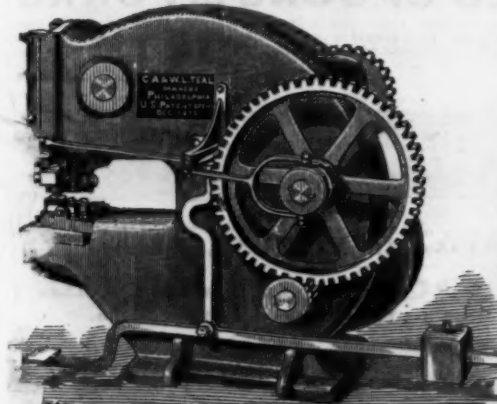
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JACKS for Pressing on Car Wheels or CRANK PINS made to order

TEAL'S IMPROVED POWER PUNCH.

U. S. PATENT OFFICE, DEC., 1875.



The above represents our new pattern of  
Single Punch. The "head" is worked by a  
lever with jaws in the back end, which carry  
a Cam-gear with "treads," one on each  
side of the teeth; underneath the Cam and  
on the shaft of the large gear is a Pinion,  
with treads corresponding to those on the  
Cam; as the Pinion revolves, the Cam rolls  
round upon it, the shape (of the Cam) being  
such that about four-fifths of the circum-  
ference are employed in raising the lever  
and the remaining one-fifth is dropping it,  
giving the head a slow downward and a  
quick upward motion. The advantage of  
this will readily be seen, as the friction of  
the Cam is rolling friction, except that of  
the pin on which it revolves; the motion be-  
ing like rolling up an inclined plane. The  
bearings for the lever in the punch-head are  
provided with an arrangement for taking  
up the wear or lost motion, which avoids  
the necessity of repairing. The die-seat is  
capable of very accurate adjustment with  
the punch; and for boiler makers the ma-  
chine is made small at the end on which the  
die-seat rests, for punching flanged heads,  
angle iron, &c. Punch Strips are also ad-  
justable to any thickness of iron.

These machines are provided with a loose  
and heavy fast pulley, and are made separ-  
ate for punching, shearing plate and cutting  
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can be furnished with attachments for all three purposes. Our regular patterns for Boiler Makers will punch  
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"Note."—The above are my standard mixtures, and have given satisfaction wherever used, but I am prepared to make Anti-Friction Metal of any quality or mixture desired by the purchaser.

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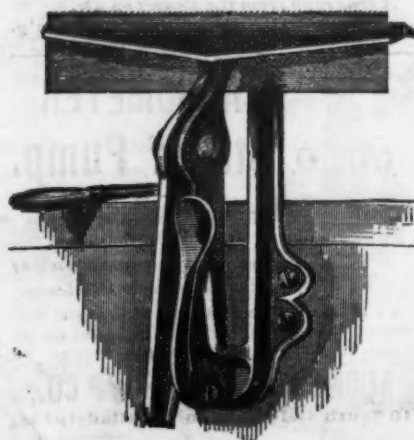
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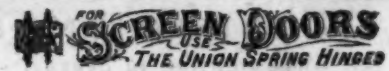
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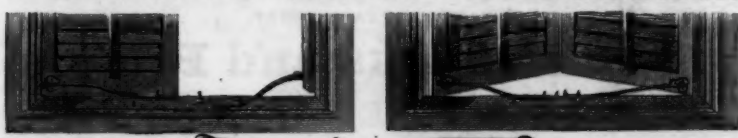
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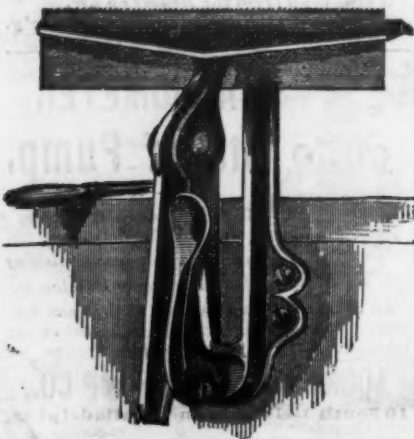
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